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ne-July, 1947 50 Cents Vol. 40, No. 6

SEVENTY-TWO AMERICAN BIRD SONGS

ON VINYLITE PLASTIC PHONOGRAPH RECORDS

American Bird Songs

These Phonograph Bird Song Records are from the Laboratory of Ornithology, Cornell University. They were recorded in Native Wilds by the Albert R. Brand Bird Song Foundation.

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THE PROCESS OF RECORDING

These recordings were all made in the birds' natural haunts. The scientists used a sensitive microphone at the focal point of a three-foot parabolic sound-reflector which was aimed, like a gun, at the singing bird. The sound waves thus intercepted were transformed by the microphone into electrical impulses, much amplified in a sound-truck, and then used to vibrate a delicate galvanometer on which was fastened a tiny mirror. A slender beam of light shining on this vibrating mirror was deflected to a 16-millimeter film which passed from one magazine to another at a constant rate of speed. Thus the bird's song was photographed so that the image or sound-track developed on the film could be used in a reverse process and made to reproduce the song, which was then, in the laboratory, recorded on a phonograph disk.

The bird's song had to be amplified several thousand times. That means that extraneous sounds, such as wind in trees, running water, airplanes, farm machinery, and notes of other birds were amplified too. For that reason many promising attempts at recording proved failures. The songs here recorded represent the best results of many efforts.

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Birds of the Northwoods

No. 1 A	*No. 1 B*
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2. Veery	2. Rose-breasted Grosbeak
3. Wood Thrush	3. Slate-colored Junco
4. Hermit Thrush	4. Yellow-bellied Sapsucker
5. White-throated Sparrow	5. Alder Flycatcher
6. Whip-poor-will	6. Olive-sided Flycatcher

Birds of Fields and Prairies

No. 4 A	*No. 4 B*
1. Bobolink	1. Prairie Horned Lark
2. Meadowlark	2. Savannah Sparrow
3. Western Meadowlark	3. Lark Sparrow
4. Vesper Sparrow	4. Killdeer
5. Field Sparrow	5. Spotted Sandpiper
6. Red-winged Blackbird	6. Burrowing Owl

Birds of Northern Gardens and Shade Trees

No. 2 A	*No. 2 B*
1. Song Sparrow	1. Chickadee
2. Robin	2. Wood Pewee
3. Catbird	3. Chipping Sparrow
4. Baltimore Oriole	4. Red-eyed Vireo
5. Yellow Warbler	5. Yellow-throated Vireo
6. Flicker	6. Warbling Vireo

North American Game Birds

No. 5 A	*No. 5 B*
1. Ruffed Grouse	1. Gambel's Quail
2. Bob-white	2. California Quail
3. Wild Turkey	3. White-winged Dove
4. Dusky Grouse	4. Woodcock
5. Prairie Chicken	5. Canada Geese
6. Chachalaca	6. Mallard Duck

Birds of Southern Woods and Gardens

No. 3 A	*No. 3 B*
1. Indigo Bunting	1. Mockingbird
2. Pine-woods Sparrow	2. Brown Thrasher
3. Pine Warbler	3. Cardinal
4. Orchard Oriole	4. Summer Tanager
5. Yellow-breasted Chat	5. Chuck-will's-widow
6. Carolina Wren	6. Barred Owl

Birds of Western North America

No. 6 A	*No. 6 B*
1. Wren Tit	1. Lazuli Bunting
2. California Thrasher	2. Blue Grosbeak
3. Nuttall's Sparrow	3. California Shrike
4. Fox Sparrow	4. California Purple Finch
5. Western Tanager	5. Plumbeous Vireo
6. Black-headed Grosbeak	6. California Woodpecker

★

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Courage Wins

In 1935 Joel M. Swenson of New Richland, Minnesota, was seriously injured in an automobile accident, spending nearly two years in a cast. Before he recovered, arthritis took command, confining him to bed and wheelchair and leaving him seriously crippled. Birds, however, gave him inspiration and the desire to pass this enthusiasm on to others, so, as a means of carrying a message of bird understanding, he forced his arthritic arms and hands to make bird houses for old and young in the neighborhood. He has built homes for many different kinds of birds, large homes and small homes, shelters and feed boxes, especially for boys and girls. He feels that the boy or girl with his or her own bird house will eagerly watch the avian tenants and do all possible to promote the welfare of the birds. Mr. Swenson does not paint the houses because he feels that youngsters love to paint and should have their part in preparing the birds' homes. Above is a picture of some of the houses Mr. Swenson has built despite his handicap and because he feels that "when one wants to, he can always do something worthwhile." Mr. Swenson says that he would love to have *Nature Magazine* regularly but cannot afford it. Would anyone care to present him with the magazine for a year?

In the Earth

The Rare-Earth Elements and Their Compounds. By Don M. Yost, Horace Russell, Jr., and Clifford S. Garner. New York, 1947. John Wiley and Sons. 92 pages. $2.50.

This book is directed towards an audience of chemists, physicists, engineers and research workers interested in the field of rare-earth chemistry. The scope of the book includes spectroscopic, thermodynamic, statistical mechanical and nuclear properties.

Study of Landforms

Geomorphology. By C. A. Cotton. New York. 1947. John Wiley and Sons. 505 pages. Illustrated. $6.00.

This is the fourth edition of this book, which presents an introduction to the study of landform. Although not written as a conventional textbook, it fits into a first-year college course in geology and geography. The author is Professor of Geology, Victoria University College, Wellington, New Zealand.

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Nature in Print

By HOWARD ZAHNISER

SIX YEARS ago a coincidence in publishers' schedules brought together for me Vilhjalmur Stefansson's *Ultima Thule: Further Mysteries of the Arctic* and August Derleth's *Village Year: A Sac Prairie Journal,* and I found (to quote myself) "more of the thrills of exploration reflected in *Village Year* than in *Ultima Thule,*" seeing in Mr. Derleth's journal "evidence of the adventures just outside the door—if the door opens toward the countryside."

Once again August Derleth has gathered into a volume selections from his journals over a series of years, this time entitled *Village Daybook: A Sac Prairie Journal.* And once again coincidence in publication dates (less than a week apart) has brought me at the same time a volume of distant adventure—this time Robert Cushman Murphy's *Logbook for Grace: Whaling Brig Daisy, 1912-1913.* I am not aware of any special personal concern with coincidence, or of any habitual pursuit of the pleasures of paradox, yet I have not been able to disregard this recurrence of coincidence, or to escape from the thought that I could enjoy much better an opportunity to read the neglected classics on a whaling cruise than in the village living I have so long coveted. Perhaps authors little realize how devious are the enjoyments in which their readers indulge, or suspect what chance associates they may have in their readers' minds! Mr. Derleth is this time no rival in adventure for his fellow guest in my reflections, but both he and Dr. Murphy are indeed welcome, and I am beginning to think that it might be a good practice always to read books in such pairs. Perhaps we could call it companionate reading.

August Derleth's interests are not only in the countryside with its stars, clouds, streams, fields, hillsides, marshes, plantlife, and wildlife, but also in people (a form of life one gets to know rather well in a village and its farm environs). Mr. Derleth is himself both in and of the village, and yet he has a sophisticated self consciousness that aids him greatly in exploiting for readers his observations and listenings in the barber shop and harness shop, in his neighbors' homes, and in village gatherings and chance meetings. One does get close to the facts of life in a small town, and a reader of *Village Daybook* will share with its author an amused acquaintance with many kinds of natural occurrences. Occasionally one may feel that he is sharing too much of a literary self consciousness, but throughout he is sure to share also an awareness of vitality and a sense of the charm of life. Many readers, noting the numerous poems that in *Village Daybook* are the same sort of culmination for journal entries as they were for the experiences recorded, may consider Mr. Derleth's volume as one of the best of literary devices for the presentation of verse. There are three dozen poems in the book, and these—even without the prose—would for some readers be an ample reward from the volume. Still others will particularly prize the woodcuts (or woodcut-like engravings) that Frank Utpatel has fashioned with the same boldness, reverence for the real thing, and creative observation that his author's writings show.

If literary self consciousness shows through to other readers here and there in Mr. Derleth's writings as it seems to me (though I must guard against laboring too much a perhaps trivial matter because of my own interest), it may be by others also attributed to the fact that apparently Mr. Derleth at the time of his writing was more aware of readers in general and of himself (as a journal writer of course should be) than of any particular person or persons to whom he was communicating. (It would not be the first failure of a writer to have an immediate awareness of a reader.)

The advantages to readers in general of an author's constant awareness of personal communication are, on the other hand, most convincingly demonstrated in Dr. Murphy's *Logbook for Grace.* We can be thankful that Dr. Murphy not only had the experience of his expedition as a lone scientist on a New Bedford whaler during a wind-ordered round-trip from the West Indies to South Georgia (1200 miles east of Cape Horn, and much farther from Atlanta!) but also that he wrote currently of his activities, observations, and reflections to his far-away bride at home, eagerly mailing to her his accumulated log, at every posible port. We have thus the writings of one most keenly aware of a reader, and fortunately for us a reader who shared an interest in Dr. Murphy's concerns, but not in his scientific vocabulary or his technicalities.

It seems safe to speculate that *Logbook for Grace* will be read for many years to come, and that its interest will be sustained not only by its content but also by the vividness and intimacy of its communication of human experience. One can not help wondering how it has so long remained unpublished, but the realization that it seems vital today, although its events occurred before the First World War, is itself an assurance of an untimeliness.

It is a temptation to catch the eye or the ear of any who may be held for quotation at length again and again. There are many enjoyments of the more personally "for Grace" notes—the delicate intimacy, for instance, of the sly sentence—"I am naming this Grace Glacier (paradoxically)"—and the somewhat more obvious slyness in a later reference to the same mass of ice: "Across the cove is the Grace Glacier, where the blue ice rises sheer more than two score feet. It resembles you in its shining countenance rather than in its temperature!" (One with better opportunities to keep aware of feminine concerns than were available on a whaling cruise might have been as cautious in implying a shining face as in suggesting coolness.) But, trifling aside, there is in this rich logbook much more of the deeper intimacy that is revealed in the confiding of such noble aspiration as:

"I want to be able to grasp something of the whole scope of nature in the lands and seas I visit; to be broad, not narrow; to be both a naturalist and a humanist, not a mere specialist. In technical work a man of this age must specialize, but in a reconnaissance of a part of the earth's face, whether soil or sea, I want my comprehension, like that of Charles Darwin, to be able to interpret the underlying significance of clouds, hailstones, argillaceous rock, hot springs, cacti, land planarians, ice-borne boulders, carrion beetles, wingless flies, graminivorous birds, nest-building fish, viviparous reptiles, dodders, ommivorous rodents, sessile-eyed crustaceans, insect-eating plants, and foraminiferous protozoans! Nature is a chain, a million-knotted web or fishnet of life. Nothing exists of or for itself, but only in relation to other organisms . . ."

It is of course the actual experience of Dr. Murphy that gives

The Singing Tide

By NORMAN EDSON

Last night I tuned in on a wind-swept shore,
And heard the waves broadcasting to the breeze,
The hollow sounding music of the seas,
And marvelled at the beauty of the score.
It sang of flying surf that broke before
The gale in clouds of crystal harmonies,
It chanted anthems, chords, and symphonies,
And rhythms only heard when breakers roar.
Upon this pebbled beach so smooth and wide,
I found it written by the ebbing tide,
With bits of weed, and wood, and sorted pebble,
The lines from which the tide had sung its treble,
While out among the rocks and hollow caves,
The thundering bass was rolled by stormy waves.

the enduring substance to his chronicle, and this experience is not only that of a scientist studying pelagic and antarctic wildlife but also that of a sympathetic observer of men, a cultured mind also living much and well with itself and the minds of other men in books. I wish I might copy out the list of books in Dr. Murphy's library on the *Daisy* and indulge in an essay on his reading of Shakespeare and Dante. I wish I might write also of the captain and crew with whom Dr. Murphy sailed. But even with regard to the whales, the albatrosses, the penguins, and the other wild creatures of which he writes so fully and interestingly one can only suggest the wealth of the logbook. It is not one of those books that Francis Bacon describes as to be read by proxy.

Perhaps one can best commend the book in conclusion by two choice although not rare samples.

"No being," writes Dr. Murphy at the conclusion of an exciting narrative of the pursuit and capture of one whale, "can reveal more marvelous grace than a whale. Do not think of them as shapeless . . . Envision rather, this magnificent blue whale, as shapely as a mackerel, spending his last ounce of strength and life in a hopeless contest against cool, unmoved, insensate man. Sheer beauty, symmetry, utter perfection of form and movement, were more impressive than even the whale's incomparable bulk."

The complete entry for January 10 is:

"Today I visited two colonies of the gentoos, and learned where good penguins go when they die! We have often remarked upon the extraordinarily few dead penguins encountered among the large populations. Now I have discovered their romantic sepulchre.

"Near the summit of a coastal hill I came upon a lonely pond in a hollow of ice-cracked stones. Several sick and drooping penguins were standing at the edge of this pool of snow water, which was ten or twelve feet deep. Then, with a tingling of my spine, I perceived that the bottom was strewn, layer upon layer, with the bodies of gentoo penguins that had outlived the perils of the sea to accomplish the rare feat among wild animals of dying a natural death. By hundreds, possibly by thousands, they lay all over the bed of the cold tarn, flippers outstretched and breasts reflecting blurred gleams of white. Safe at last from sea leopards in the ocean, and from skuas ashore, they took their endless rest; for decades, perhaps for centuries, the slumberers would undergo no change in their frigid tomb."

How fortunate the lady Grace was to receive such a logbook, as it was written. How fortunate we are to be invited to share it.

Logbook for Grace: Whaling Brig Daisy, 1912-1913. By Robert Cushman Murphy. New York: The Macmillan Co. 1947. 290 pp., with 6 text drawings and 3 outline maps. $4.

Village Daybook: A Sac Prairie Journal. By August Derleth. Chicago: Pellegrini & Cudahy. 306 pp., with 26 engravings by Frank Utpatel, and end-papers map by Hjalmar Skuldt. $3.25. (One of the first books to appear under the Pellegrini & Cudahy imprint, this volume is fresh and clear in its typography and well manufactured in the best of taste, suggesting congratulations and good wishes for many more such publications.)

Edna Writes a Book

Sunstar and Pepper. By Edna Hoffman Evans. Chapel Hill, N. C. 1947. University of North Carolina Press. 294 pages. Illustrations by A. E. Park. $2.50.

Without breathing a word to us, Edna Evans, co-author of our Camera Trails Department and frequent contributor to our pages, has written a book. It is not a Nature book, but because it is a sort of magazine family affair we proclaim the right to give it notice here. The sub-title of the book is "Scouting with Jeb Stuart", and it is fiction written against a background of historical research. Potter Pepperill is a sixteen-year-old boy to whom Jeb is an idol, and the boy, with his horse, "Sunstar", join the famous cavalryman for scouting duty. The result is an exciting story that will delight boys and girls—and grown-up boys like us.

R. W. W.

Virginia's Mammals

The Mammals of Virginia. By John Wendell Bailey. Richmond 21, Virginia. 1947. Published by the author at 27 Willway Road, 416 pages. 99 illustrations. $5.00.

This book fills a hitherto unfilled place in mammal literature. Its author is a consulting biologist specializing in stream improvement and industrial waste utilization, and was formerly head of the department of biology in the University of Richmond. Before he gets down to the classification and description of the mammals of the Old Dominion, Dr. Bailey presents several interesting chapters dealing with the history of Virginia mammalogy, with the mammals of the region through geologic time, conservation and other essential background material. The chapter on conservation, especially, will repay careful reading. The remainder of the book presents description, life history, distribution and other data on the one hundred and thirty recent mammal forms recorded within the geographical and political limits of the Commonwealth of Virginia. Dr. Bailey's book will be of wide value as a textbook, and for the use of individuals and organizations interested in the study of mammalian life.

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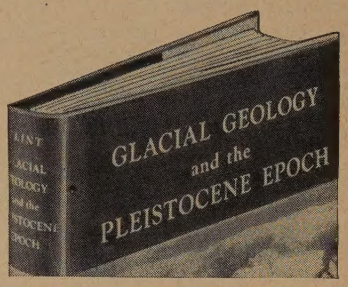

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To Stimulate Public Interest in Every Phase of Nature and the Out-Of-Doors, and Devoted to the Practical Conservation of the Great National Resources of America

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NATURE MAGAZINE is published monthly, October to May, inclusive, bimonthly, June to September, inclusive, by the American Nature Association. Entered as second-class matter May 31, 1927, at the post office at Washington, D. C., U. S. A., and accepted for mailing purposes at the special flat rate of postage provided for in the United States Postal Act of October 3, 1917, and February 28, 1925. $4 a year; foreign $4.75.

Publication and Editorial Office, 1214 16th Street, N.W., Washington 6, D. C.

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Geology of the Glacier

Glacial Geology and the Pleistocene Epoch. By Richard Foster Flint, New York. 1947. John Wiley and Sons. 589 pages with six end maps. $6.00.

This scholarly and concise reconstruction of the epoch of glaciers is directed toward an audience of geographers, ecologists, geologists, archeologists and all others interested in the prehistoric story. The text treats with the Pleistocene from the viewpoint of its outstanding characteristic—glaciation. The author is Professor of Geology at Yale University, and he writes interestingly, his text, to our mind, having general appeal to the intelligent layman as well as the specialists at whom it is aimed.

Nature Games

Instructive Nature Games. By Paul W. Nesbit. Estes Park, Colorado. 1947. Published by the author. 36 pages. Drawings by Jewell W. Nesbit. $0.75.

In this helpful booklet Mr. Nesbit has collected descriptions of Nature games selected and developed for their teaching and entertainment value. For the most part they are outdoor games that have been tried out and perfected with actual groups. The author is a former ranger-naturalist with the National Park Service, and has also had camp leadership experience, taught Nature study classes in schools and worked with Boy Scouts. Thus he has had ample opportunity to see how these games work and what the reaction of participants has been. The result is a most practical little booklet.

Williamsburg

America's Williamsburg. By Gerald Horton Bath. Colonial Williamsburg, Inc. 1946. Williamsburg, Virginia. 48 pages. Pictures by Wendell MacRae. Sixty-five cents.

Anyone who has visited Williamsburg will cherish, and anyone planning to visit this beauty spot will wish, a copy of this attractive booklet. In concise text Mr. Bath tells the story of the restoration, sponsored and financed by John D. Rockefeller, Jr. This text is supplemented by splendid pictures of Williamsburg before and after the tremendous and painstaking task of re-creation.

Lilies

Lilies for Every Garden. By Isabella Preston. New York. 1947. Orange Judd. 160 pages. Illustrated. $2.00.

This little book is aimed at the amateur enthusiast for lilies who wants a simple and practical guide to growing lilies successfully. It is written against the background of the author's personal experience as a plant breeder and grower of lilies.

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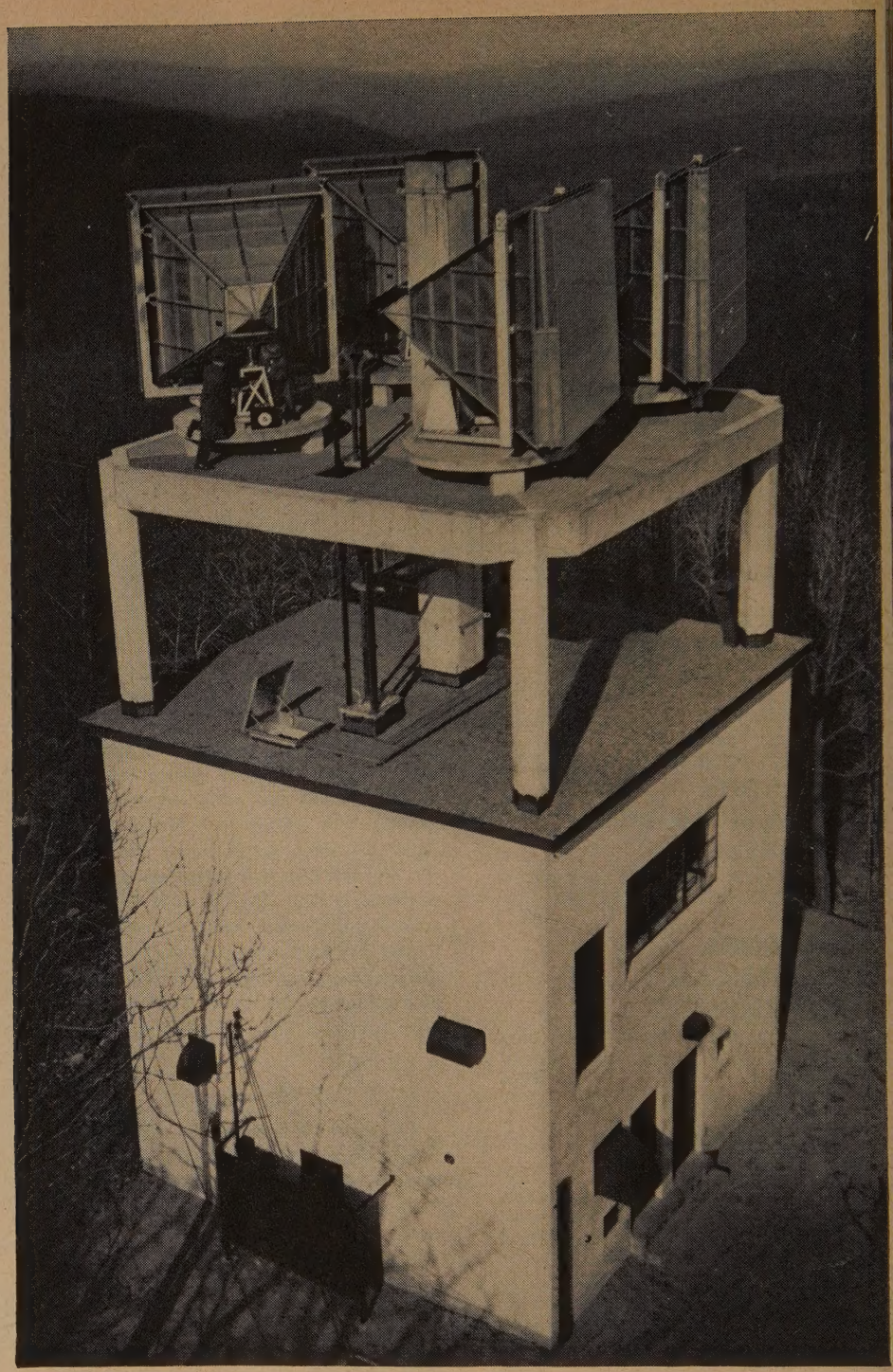

Airplane photograph of one of seven relay stations — to test use of radio "microwaves" for Long Distance services

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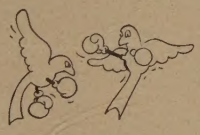
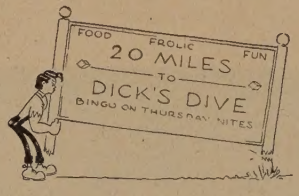
Contents Noted

As we expected, Lethe C. Pape's tub-thumping for the English sparrow brought in some definite letters of dissent from other bird-loving readers. From Bangor, Pennsylvania, Edith V. Paul observes that Mrs. Pape's sparrows must be much better behaved than those in the Quaker State, "for here they drive all other birds away from the place where we put feed for birds every winter. And they are very much given to fights, even among themselves. . . . As far as we can see, the only birds that cause trouble to native birds are starlings and English sparrows." Elizabeth Huntington of Pleasantville, New York, is emphatic in her dissent from Mrs. Pape's claim that a chickadee, nuthatch or woodpecker "will never suffer another of his kind to feed with him." On this Miss Huntington says: "This winter I have had at least ten chickadees feeding peaceably together, as well as nuthatches and woodpeckers. . . . My English sparrows are always making trouble, both among themselves and with other birds. If the English sparrow is 'The perfect gentleman', I'm speechless!" So the sparrow argument goes. Mrs. Pape freely admits that her observations may not be perfect, but her major interest is in getting others to be interested in and solicitous of the birds. More power to her, and stirring up a pro and con argument on the English sparrow is a rather good way of doing it, if we may judge by our correspondence. But we will end this here.



We were amazed, and wryly amused, to discover in the April, 1947, *Ohio Conservation Bulletin*, official publication of the State Division of Conservation of Natural Resources, a feature attacking the crow and entitled "The Gangster of the Air." Our surprise arose not because of the printing of the anti-crow article, for Ohio, being relatively a game bird desert, naturally looks around for something for its gunners to shoot at, and is happy to make a case against the crow. Our amazement comes from the source of this article—*American Game*—and its introductory sentence, which reads: "The American Game Association advocates a nationwide hunt upon the worst gangster of the air, the bold, bad crow." One would gather that the American Game Association had just come to this momentous conclusion and made this pontifical assertion. As a matter of fact, the American Game Association died in 1935, and the magazine from which the article is published died with it. In the past two decades much study has been given to the food habits of the crow, and scientific evidence shows that there is as much positive as there is negative about this clever black bird. That the statute of limitations ran out long ago in this particular indictment of the crow should be obvious, yet here we find it presented as news of the moment. It is hardly editorial cricket, to our view.

We do not regularly see the comic strip called Li'l Abner—which apparently is our loss—but several readers have delightedly clipped and sent us a strip that appeared in mid-February, showing a character called Yokum out riding with his girl in the country. She is reading a map that promises a beautiful scenic view, but when the spot is reached there stands a great billboard beside the highway. Yokum jumps from his Model T and uproots the sign, revealing the view. The heading on the strip that day was "Obey That Impulse!" Many of us have wanted to do just that, even though we have lacked Yokum's temerity and muscular ability to tear up a billboard by its ill-placed roots.



Silver anniversaries are symbols of a milestone of service, and such is the case with the anniversary celebrated recently by The Blatchley Nature Study Club of Noblesville, Indiana. Named for W. S. Blatchley, perhaps the most distinguished name in Indiana's natural history, the club has a long record of educational programs, field trips and other constructive activity. Observing its twenty-fifth anniversary, the club sponsored special Nature displays in the windows of many of Noblesville's stores. A banquet and program at the Masonic Temple brought the celebration to a climax, and emphasized the important position held by the organization in the community. Under the presidency of Herbert Gentry, the Blatchley Club starts its second quarter century as perhaps the outstanding Nature group to be found in any small community. We hope plans for a clubhouse will materialize, and that the club will move on toward its golden anniversary with new laurels for its service to the community and to Nature. R. W. W.

Shou Hsing, the God of Longevity, holds a peach in his hands while a double gourd hangs at his side. Greenish-white jade with brown markings. 18th Century. Courtesy, Walker Art Center, Minneapolis.

A gourd vine in full round and high relief provides ornamentation for this covered vase of greenish-white jade. 18th Century. Courtesy, Walker Art Center, Minneapolis.

A specimen of *Rohdea sinensis*, together with a sacred fungus, are the longevity symbols that enhance the interior of this greenish-white jade dish. 18th Century. Courtesy, Walker Art Center, Minneapolis.

Wine from these gourd-shaped flasks may be sipped from the stems which unscrew and reveal metal tubes extending almost to the bottom—perhaps the original drinking "straws." Corliss Hathaway photograph. Author's collection.

Nature Means Long Life in China

By MABEL IRENE HUGGINS

OLD Methuselah with his life-span of 969 years died while he was still a mere infant if compared with P'an Ku, the Chinese mythological personage who is reputed to have lived for 180 centuries. The myth of P'an Ku is closely allied with Nature inasmuch as he is credited with the monumental and arduous accomplishment of chiseling the earth from chaos and producing the rivers and trees and plants and other earthly adjuncts. To do all this, it took his entire lifetime of 18,000 years. Length of days is one of the chief desires of the contemporary descendants of P'an Ku, so it is not strange that their longevity symbols are taken from Nature.

We might expect that P'an Ku would be the Chinese God of Long Life, but this is not the case. Instead, the position is filled by Shou Hsing, the Star God of Longevity, who is one of the supreme divinities in the Taoist religion, a way of thought that has been strongly influenced by the phenomena of Nature. Shou Hsing, also called Shou Lao, is always represented as a pleasant-faced old man with a pronounced bump on the top of his head. He is sometimes accompanied by a deer or a crane—frequently by both. Shou Lao's hands usually hold a peach, the fruit of immortality and one of the principal symbols of longevity.

A craftsman of the Ch'ien Lung period (A.D. 1736-1795) selected the "three friends" as the motif for this blue and white plate. An additional long-life symbol was inserted at the base of the prunus tree, where he placed a sacred fungus with a few blades of grass behind it. Corliss Hathaway photograph. Author's collection.

According to legend, Hsi Wang Mu, the Queen Mother of the Western Paradise, had a famous peach tree in her palace grounds. The fruit that it bore ripened only once in 3000 years, and anyone who ate of it received the gift of life for an equal period of time.

Sun Hou-tzu, the monkey who became a god, is another figure whose hands are often shown grasping the long-life peaches, which he stole from Hsi Wang Mu's fabulous tree.

The peach is constantly used in Chinese art. It appears not only in paintings but also on porcelains. Plates, wine-cups, bowls, vases, and snuff bottles are among the

A sacred fungus, *Fomes japonicus*, forms the body of this grayish-white jade vase which has smaller fungus branches in high relief at the sides. Ming Dynasty (A.D. 1368-1644). Courtesy, Walker Art Center, Minneapolis.

articles that are enhanced by sprays of peach blossoms or fruit. At times wedding wine-cups are made to resemble twin peaches. Peach-shaped wine-pots of pewter and boxes of lacquer or wood are other products of the craftsman's skill. The peach is likewise used as a popular design in textiles and embroideries.

In Peiping the peach symbol features in a unique birthday gift. A common item of food in North China is vermicelli, which, because of its length, is considered symbolic of long life. Therefore, a suitable birthday present is a plate of uncooked vermicelli coiled to form a truncated cone, in turn surmounted by a group of peach-shaped and peach-colored buns, the whole expressing a wish that the recipient may live to a good old age. In other words, it is the Pekinese way of saying, "Many happy returns of the day."

The pine, the bamboo, and the plum are each emblematic of longevity. The first two seem endowed with a deathless quality because both remain green all winter. With just as evident a token of life the gnarled trunks of old plum trees put forth new shoots that burst into bloom before the winter is really past.

Probably there is no plant in China that is more generally loved than the bamboo. Indeed the folk of the bamboo-growing regions cannot understand how people in other places can possibly get along without this remarkable grass. The pine is also a great favorite, and is protected in cemeteries and in temple courtyards so that, throughout the country, there are many specimens that have attained "unremembered years." The esteem in which the plum is held was plainly indicated when it was chosen as China's national flower.

Anyone who is familiar with Chinese art has been impressed with the vast number of times these three plants have served separately as subjects for the painter's brush. As a group, also, they have not been

This gourd-shaped tobacco pouch of black satin and fine embroidery abounds in long-life symbolism. In the lower portion the "three friends" are represented by two clusters of pine needles, five bamboo leaves, and a branch of plum blossoms. The remainder of the decoration is composed of three renderings of the sacred fungus form. Corliss Hathaway photograph. Author's collection.

neglected. The worker in jade finds that the "three friends" are fitted to his purpose and he produces a double vase in the form of two stumps, one a bamboo, the other a pine—surrounding them with bamboo, plum, and pine branches in high relief. A blue and white plate shows that the decorator of porcelain can make use of the trio to equal advantage. Nor can either of these craftsmen outdo the skill of the needle-worker who executes embroideries that employ this threefold longevity symbol.

Another plant that is looked upon as signifying long life is *Rohdea sinensis*, a member of the Lily family. Its Chinese name is *wan-nien ch'ing*, literally, "ten thousand years green." It is used primarily as an ornamental plant because of its luxuriant evergreen foliage. A short flower stalk that later develops bright red berries springs upwards from the center of its stemless rosette of leaves.

In some areas bunches of *Rohdea* leaves, together with the leaves of the sweetflag, *Acorus calamus*, are tied to the ridgepoles of new houses when they are raised. Thus are embodied wishes for long life and prosperity for those who are to dwell in the house.

Sun Hou-tzu, the monkey who became a god, swings in the peach branches that ornament this pewter teapot. This god is often shown grasping in his hands the long-life peaches that he stole from Hsi Wang Mu's fabulous tree. The peach is constantly used in Chinese art for it is rich in symbolism. Corliss Hathaway photograph. Author's collection.

This double vase of grayish-white jade represents two stumps—one a bamboo, the other a pine—with high-relief bamboo stalk, pine and plum branches surrounding them. 18th Century. Courtesy, Walker Art Center, Minneapolis.

Craftsmen who work with semi-precious stones like to make "jewel trees," ornate contrivances that represent a great array of dwarf trees and potted plants. Among the favorite kinds are Chinese sacred lilies, chrysanthemums, plums, orchids, and *Rohdea*—each made from stones of the most appropriate hues. In the case of *Rohdea*, thin blades of green jade form the leaves and highly polished carnelians the berries.

A woody fungus that has been identified as *Fomes japonicus* is another of the high-ranking longevity symbols. The Chinese cuisine utilizes fungi of various sorts in countless dishes that require as an ingredient "mushrooms" both dried and fresh—*mu-er*, "wood ears," *shih-er*, "stone ears," and *t'u-chün*, "earth mush-

rooms." For none of the others are such stupendous claims made as for *Fomes japonicus*, the Chinese "spirit fungus," which is supposed to make an immortal of the one who eats it. Now and then dried specimens of this fungus are placed on the altars of Taoist temples.

Fungi are not a common subject in Western art but in China the sacred fungus appears with great frequency in paintings, on porcelains, in textiles, and in objects of jade. Sometimes this "plant of immortality" is shown in a realistic manner, peeking from clefts in the rocks at the roots of wind-buffeted trees; or it is carried in the mouth of a deer or the beak of a crane. In a highly conventionalized aspect it is used as a trifoliate border design on porcelains or on pieces of cloisonne. This same stylized form, appearing in clouds and waves, is found as a motif for embroideries and textiles. It is most often met with, however, as the head of the *ju-i* scepter, a congratulatory gift that expresses a hope that all of the recipient's wishes may be gratified.

Perfect simplicity characterizes this small glass bottle, which comes from the Sung Dynasty (A.D. 960-1270). It was probably a medicine container—a use which is suggested by its gourd-like shape. Collection of The William Rockhill Nelson Gallery of Art, Kansas City, Missouri.

Another emblem of long life is the gourd, which is also a symbol of magical powers. From early times the Chinese have made use of dried gourd shells, their hardness and durability being qualities that recommend them for bottles, dippers, drinking cups, and other utilitarian articles. For centuries an especially favored sort has been the *hu-lu*, *Lagenaria vulgaris*, a "double" gourd with a natural constriction about its middle.

Sometimes the *hu-lu* is called the pilgrim's gourd. As such it is carried by the God of Longevity when he journeys forth through the air on craneback.

"Iron-crutch" Lee, a lame beggar in appearance, is never shown without his *hu-lu*. From an ancient legend we learn that Lee, one of the famous Eight Immortals, became so skilled in the mysteries of Taoism that his spirit could float away to celestial realms while his body was looked after by one of his disciples. Unfortunately on one occasion Lee's spirit remained absent an unduly long time. In fact so much time passed that the caretaker decided that his master was really dead, and, proceeding to dispose of the "corpse," he departed for home. At this juncture Lee's spirit returned, but, finding himself minus his own body, he groped about and appropriated one which had until recently belonged to a lame beggar. Hence, Lee is always represented as a crutch-using beggar who carries a *hu-lu* with vapor spiraling upwards from its neck to indicate his body-leaving ability.

The double gourd is not only used as an accessory to Taoist divinities in paintings and on porcelains but also serves as a decorative motif in practically all kinds of artistic expression.

Chinese craftsmen have found great appeal in the form of the *hu-lu*, if we are to judge from the innumerable objects that they have made in this shape. There are medicine bottles of glass, snuff bottles of semi-precious stones or porcelain, wine-flasks of pewter, and vases of porcelain—all gourd-shaped.

The double gourd has also been the model for exquisitely embroidered tobacco pouches, which hang from the long stems of men's pipes. Smaller bags of a similar shape are used as sachets, which fashionable ladies suspend from the buttons of their costumes. And sometimes well-dressed women have bright red, gourd-shaped ornaments of chenille in their hair.

In front of Chinese medicine shops are signboards like big double gourds, which, in their very shape, have a symbolic implication as to the life-lengthening properties of the medicines that are on sale.

Without an interpretation of Chinese Nature symbols, the art objects of China remain meaningless to us. An uninitiated Westerner looks at a beautiful screen of white nephrite decorated in low relief with some bamboo, a sacred fungus, a prunus tree, and a *Rohdea:* "A botanical hodgepodge," he thinks in his ignorance. In contrast, the person who knows Chinese long-life symbols looks at this same screen and sees at a glance that the designer produced a composition as harmonious as a string quartet, each of the component parts reiterating the central theme—longevity.

Exception, Please!

By OREN ROOT BROWN

Rain, rain, go away;
Return—but *not* St. Swithin's Day.

The Language of the Wild

By ALAN DEVOE

PHOTOGRAPH BY W. J. SCHOONMAKER

Two fox cubs watch while their brother wanders off across the field, only to be called back by the mother by some strange method of communication.

HIDDEN behind a clump of scrub in the big pasture, I had been watching a mother fox and her three cubs playing around the entrance of their den. The youngsters were having a glorious time tussling and rough-housing in the good sunshine, and the vixen lay contentedly at the den entrance and watched them affectionately.

Suddenly one of the youngsters apparently decided to do a bit of exploring. He started to trot off across the pasture. He was much too small a fox to be out in the big world alone. I watched to see what the vixen would do. I supposed she would run after him to head him back.

But she did not. She just got to her feet, "pointed" with her sharp muzzle in the direction of his retreating little form—and stood rigidly silent and still. She did not make a sound; or at least none that my human ears could hear. But in a few seconds the little cub began to waver in his steps, and then, uncertainly, he slowed down and stopped. He turned quickly around and looked straight at his mother. She kept her gaze on him. As if pulled by an invisible thread, the little fox came hurrying for home.

Years later I found an almost identical episode recorded by a well-known naturalist, and subsequently other similar observations have come my way, so the happening was perhaps not as rare and strange as I had thought. But that little scene of inaudible communication at the fox den remains ever vivid in my memory. It was what started me investigating the endlessly amazing thing that is the language of the wild.

Animals "talk" in many different ways. Some send messages to each other by a kind of Morse code. Others express themselves in a language of dancing. I have "listened-in" on conversations that were conducted by gestures and something like muscle-reading; and have watched other conversations taking place without any detectable sound or action, as if at some level of animal-intuition that we humans have lost the gift of understanding. All outdoors is full of the "talk" of wild things, and learning to hear or read it is one of the most fascinating studies a naturalist can make.

When a worker bee, searching among the blossoms, has found a flower full of sugary nectar, it flies back to the hive and tells the good news to the other bees. How? Bee-talk is dance-talk. Back at the hive, the bee that has discovered the nectar begins a peculiar hovering dance in the air. It fairly shimmers with the excitement of its urgent message. The excitement is communicated from the dancer to the other bees. One by one they join in, and presently troop eagerly from the hive. They search the countryside until the source of nectar supplies is found. The message of food-discovery has been conveyed to the hive as effectively as if it had been spoken.

Rabbits make use of rappings, thumping their hind feet sharply on the ground to convey messages of anger and alarm among their kind. The tiny white-footed mouse uses a similar means. White-foot regularly stakes out a small particular part of the forest for his private land. When trespassing mice come invading it in the darkness, White-foot warns them off by the staccato transmission of a "No Trespassing" message that is understood throughout mousedom.

Probably the most proficient of all the users of the language of tapping are the woodpeckers. To announce territorial rights, a woodpecker seeks the handiest sounding-board of resonant dead wood and raps out the property-tattoo. It carries the announcement to all the other woodpeckers of the countryside, as African drum-beats transmit a proclamation from village to village.

When any big, alarming creature, such as man, for instance, appears in the animal world, it is fascinating to watch how the alarm is raised and passed along by a dozen different kinds of talk. Perhaps a bluejay is the first to sight the danger. He gives his sharp "Beat it!" cry. Instantly other birds and squirrels take up the message, translating and relaying it as it goes spreading out over the woods-wireless.

A female wild duck transmits it to duckdom by uttering a harsh cry and flying suddenly high aloft. A partridge translates it by making a short, swift flight from tree to tree with loudly whirring wings. A mother bear brings her cub scrambling down from a treetop by thwacking the trunk in a telegraphed danger-signal. Over by the beaver pond, outside the "lodge" where the young ones are, an alert beaver catches the message and instantly relays it in beaver-talk. He raises his heavy flat tail and slaps it with a tremendous *whomp* on the surface of the water. In beaver-language, that means just one thing: "Watch out!"

PHOTOGRAPH BY IVAN R. TOMKINS

Encountering a female on the beach, the fiddler crab raises his big claw and waves to her.

Animals not only have their own vocabulary for danger and for giving warning, but for all the other emotions and situations in their lives.

Naturalists versed in the ways of the north woods testify that when a male wolf has obtained more food than he can eat himself, he buries a portion of it and voids his scent over the place. The others of the pack understand the message perfectly. A wolf "speaks" again and again, in the course of his foraging, by leaving scents that are as eloquent to other wolves as a human explorer's maps and diaries are to those who come after him.

Wolves and foxes—in fact, all members of the dog family—live in a world that is not just a landscape but a "talking smellscape." Professor F. J. J. Buytendijk, of the University of Groningen, who has conducted remarkable experiments in investigation of the psychology of dogs, points out that a dog is engaged in constant "conversation" with all the other dogs of his countryside—exchanging all sorts of information about food, sex, and all the rest of the community gossip—just by progressing attentively from tree to tree.

It is not only the higher animals that "talk." Even the humblest kinds have their ways of saying what needs to be said. A male fiddler crab speaks the language of love in a way startlingly human. Running along the sandy beach at low tide, and presently encountering a female, he raises his big claw and waves to her. If she responds to this silent but urgent message, and draws near him, he puts the full force of his persuasion into his next few "words." He dances around on tiptoe. He cuts the air with his big claw, in sweeping, alluring gestures, like one describing something unutterably exciting. Prancing, waving, posturing, he pours out in crab-talk the most ancient message in the world. It seldom fails to get across.

The way in which wild things talk to one another are almost as many and different as the creatures themselves. A doe says "This way! Follow me!" to her fawn by flirting her brushy tail suddenly upward to show the white under-side. The so-called "death watch" beetle raps out its announcements by tapping its hard snout against the walls of its dark burrow in the wood; and certain termites call to one another in much the same way. The gleaming female glow-worm at dusk climbs up a grass blade, twists and turns her flexible body, and sends out from the last three segments of her abdomen a series of flashes that constitute a nuptial message for any male that sees them.

In its time of courtship, a male hummingbird "makes address" to the female by a language that is pure poetry of motion. On quivering wings he swings before her in an aerial arc that is like the swing of a pendulum. More and more passionately he "speaks," the two ends of the arc-flight rising higher and higher, until suddenly he goes shooting straight upward in an "exclamation mark" that may carry him zooming sixty feet vertically toward the sky. An instant's hovering at that great height, and then abruptly, in a final rush of uttered devotion, he plunges down and hovers suspended, glittering jewel-like, in the air before her. We human beings are not the only creatures that can speak words of love. Even hummingbirds, in their own way, can utter a poem.

One of the queerest of all animal communications takes place between the little African bird called a honey-guide and the ratel or honey-badger. The bird

loves to feed on the grubs of bees and wasps. The honey-badger loves to feed on honey. But the little honey-guide cannot invade a bee-tree and deal with thousands of infuriated bees; and the animal has such short legs that he cannot make the long investigations needed to locate the hives. So the bird and the mammal have formed a partnership. The honey-guide flies tirelessly around the forest, searching until a bee-tree has been found. Then the bird comes whizzing to where the ratel is placidly waiting. The honey-guide dances over the animal's head, flutters and hovers in front of him, and speaks in shrill cries. *Cherr! Cherr!* Slowly the honey-badger comes lumbering, the bird dancing and fluttering before him, leading the way. Safe in his sting-proof hide and coarse-haired coat, the animal rips the hive to pieces; and bird and beast settle to feasting on the repast secured by teamwork and communication.

Arboreal ants in the tropics make themselves heard from tree to tree by tapping on the bark and leaves so vigorously that it sounds like a shower of rain. Through an elephant herd there ripples a perpetual murmur of contact-talk and signalling: a sign-language conducted by ears and trunks. The wild geese steer their flocks through the sky to the accompaniment of an intermittent "honk-talk." Jack Miner, expert on the honkers and their ways, knew their talk so well that his friends used to say he could call a wild flock down from the sky by "telling" them, gander-fashion, that there was a good pond and corn supply down where he was hiding. Other naturalists have learned to talk with bears, moose, owls. I know one veteran woodsman, now living in the city, who amuses himself at odd hours by leaning out the window and "wolf-talking." The effect on all the dogs for blocks around is astonishing. In a twinkling they shed their centuries of domestication and stand tensely alert, fairly shivering with excited response to the old language of the wild.

Of all the kinds of talk in animaldom, the most challenging is what seems to be a communication that does not use sound or scent or gesture or any other physical means. Is there really such a thing? Some naturalists believe it is telepathy. Others suggest it may be a matter of physical senses too finely delicate for our dulled human perceptions. Still others dispute the matter altogether. I may just set down, "without prejudice," the story of my two cats, Sim and Sam.

PHOTOGRAPH BY A. C. SHELTON

A Canada goose sounds a warning against intrusion and proclaims "Scram!"

All the feline tribe have exquisitely subtle senses. Tigers and house-cats alike are sensitive to impending change in the weather and to all sorts of delicate influences. Sim and Sam had these sensory gifts; and they also had a bond of inseparable brotherhood between them. Inseparable except in one respect: Sim loved to go hunting, Sam loved to laze away the hours at home.

But even when they were thus separated—Sim far out in the fields or woods somewhere, Sam curled up on the desk beside my typewriter—the bond of their brotherhood, it seemed, was not broken. Somehow, all the while, Sim and Sam seemed in communication with each other.

Sometimes Sim would have been out hunting for an hour, sometimes for half a day, when suddenly Sam would awaken from his doze on my desk, perk his ears excitedly, and cock his head for an instant as though listening. Then he would leap quickly down from the desk, run to the door, and ask to be let out.

When the door was opened, he would streak away as swiftly and surely as an arrow. Sometimes it would be across the fields. Sometimes it would be up the hill into the big woods. But there was never an instant's hesitation.

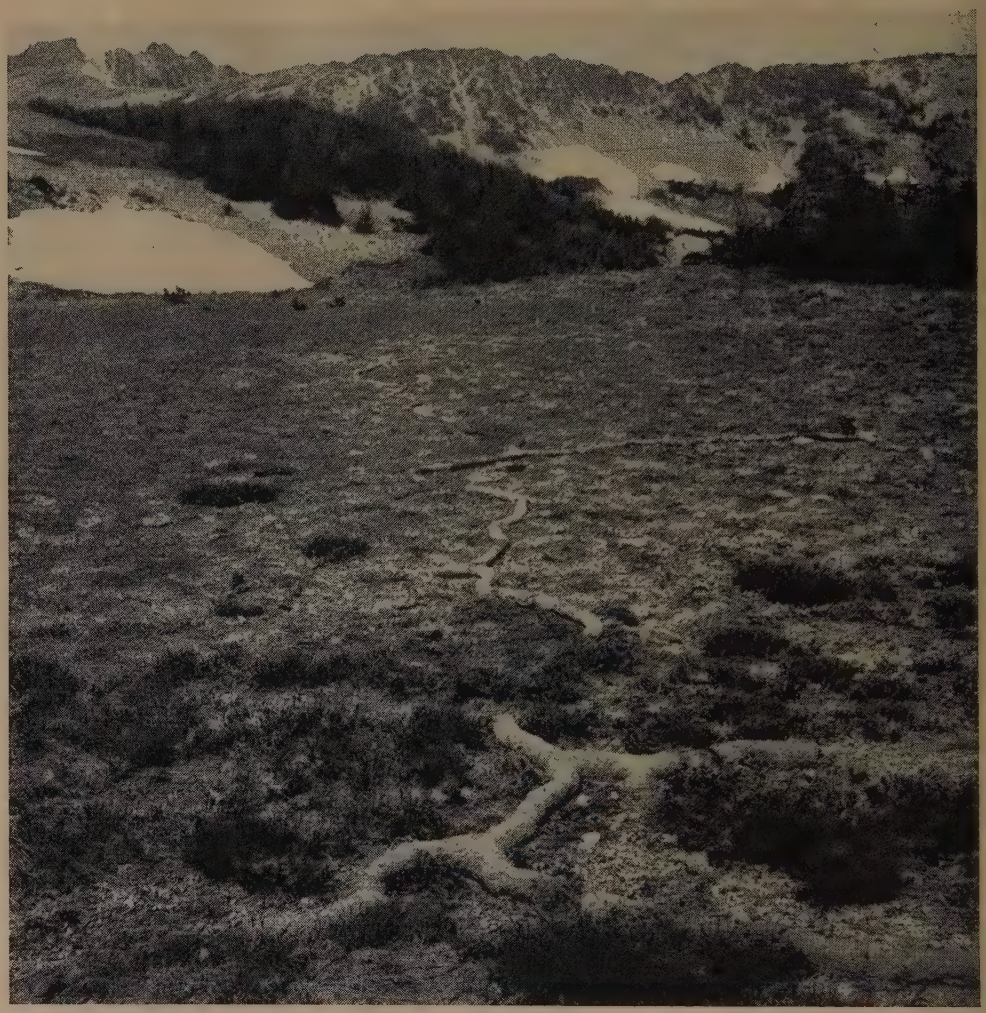
Always we would find Sim, the hunter, just starting for home with a freshly made kill.

Incredible? Fantastic? Perhaps. But there is so much we do not know about what goes on in the senses and psyches of animals that no experienced naturalist ever closes his mind too firmly. We think of fish as wholly silent. But it has been found that sunfish chatter in a grating voice by rubbing their teeth together. Globefishes growl. The spine-headed *Trigla* vibrates the muscles in its swimming-bladder to utter a clear, long-drawn whistle.

Whether fish-sounds are made for inter-communication or for other reasons is not always certain. But it is certain that the voices of the deep can be almost incredibly vociferous. The weakfish family make perhaps the most startling utterances. Christopher Coates, curator of the New York Zoological Society's aquarium, has authenticated stories about the species of weakfish called sea drums. Sea drums "speak out" with such an uproar as to wake sleepers on boats.

"Cables" on the Mountains

By H. W. HIGMAN
and
E. LARSON



AMONG the many *What-dunit* problems that Nature gives the amateur wildlife detective a chance to solve, probably none is more puzzling than the curious ground network often found in the higher parts of the western United States.

One spot where this mountain mystery is conspicuous is a depressed area, about the size of a baseball field, six thousand feet up on the side of Mount Rainier. Here the clouds hang low, and at times they veil the little alpine meadow. Remnants of the ten feet of snow that regularly covers the area in winter cling to the nearby shady slopes all summer. This desolate strip of land is just below snow line, near the upper timber limit.

The spot resembles many other alpine areas except that over its floor rambles a series of gray, rope-like structures of the size and shape of a fire hose. They curve here and there. They often fork and may run together again. They enter the ground and reappear. In places they make a close network with one line crossing several others. They cover an area equal to a city block.

These "ropes" are made of dirt, however. Obviously these smooth and regular shapes are not the result of wind and water. Are they ridges that some burrowing creatures have pushed up? They are plainly part of the earth pushed from below and they often differ, both in color and material, from the soil beneath them. What is their purpose, and what could have fashioned these long, meandering structures?

The answer is—pocket gophers. Unlike a few mammals of the higher areas, these blunt-headed rodents do not hibernate, but continue their activities through winter. They spend their lives underground, and, being master tunnelers, construct extensive burrows, becoming animated bulldozers, and usually shove the excavated dirt into piles. But when the snows cover deeply this method of disposal is impractical.

Then these able miners push their way through the more easily penetrated snow. Their purpose appears two-fold—to enable them to reach food through the snow, and to dispose of the excavated soil. Some of the snow passages are left open to travel, and others are rammed full of material brought from below. Yard after yard of snow tunnel becomes full of the closely packed debris until a meandering dirt cable system lies beneath the winter storms.

When the spring thaws come, the slowly melting snow leaves intact most of the earth-plugs that have filled these tunnels. After the snow has disappeared the remnants stand as a challenge to casual passers-by.

Edward A. Preble, member of a party of naturalists who gathered, in late August, 1896, with members of the Mazama Club of Portland, to christen Mount Mazama at Crater Lake, Oregon, the ancient volcano whose self-destruction made possible one of the most beautiful of all lakes, reports seeing, on the grassy slopes bordering the branches of Anna Creek, downward from the camp on the rim, miles of these earth ridges, relics of the winter work of the lowly gophers. Consult further: Bailey, *Mammals of Oregon*, p. 257.

ARMY AIR FORCE PHOTOGRAPH

Although it looks like any other B-25, this plane is really a flying weather station. It is a part of the hurricane patrol, started as a wartime measure and continued into peacetime to add to the meteorologist's knowledge of hurricanes and their ways. The patrol is alert all during the hurricane season, prowling the air above the coast from Maine to Texas. The flying weatherman even ventures into the heart of the hurricane in search for weather data.

Meeting the Weather Halfway

By EDNA H. EVANS

EVERYBODY has at least a mild interest in the state of tomorrow's weather, but most people are satisfied with a glance at the daily forecast. After that they wait for the weather to come to them.

But this is not always so, especially in the case of the men who draw up those daily forecasts. Often, in order to insure the accuracy of their predictions, weathermen have to go out and meet the weather halfway.

This is not necessarily as complicated as it sounds, nor does it mean racing around the world at the speed of light in order to keep ahead of the weather changes. In the main, weathermen have developed two methods of meeting the weather halfway. In one method they send out proxies. In the other, they go themselves.

Pilot balloons are the proxies weathermen send out most frequently. To be exact, "pibal" observations are made four times a day at approximately 150 stations operated by the United States Weather Bureau throughout the forty-eight states and Alaska.

U. S. WEATHER BUREAU PHOTOGRAPH

Releasing a radiosonde. A sounding balloon inflated with helium carries the radiosonde as high as 10 or 15 miles. During the flight the apparatus emits at brief intervals radio signals that are recorded by ground station equipment and translated. The parachute retards the fall so records are also obtained on the descent.

A pibal is a rubber balloon filled with gas—the Weather Bureau uses helium and the Army uses hydrogen—which is employed to determine the wind direction and velocity aloft. These measurements can be taken for levels ranging from a thousand to thirty thousand feet or even higher above the earth.

The balloons used are red, yellow, white, clear or black, depending on the state of the sky. Red seems easiest to follow when the overcast hangs low, while black shows up better when there is a high overcast. The yellow, white or clear balloons are used when the sky is clear or when there is only a scattering of clouds

ARMY AIR FORCE PHOTOGRAPH

While the hurricane roars, while the pilo is busy keeping his plane under contro and while the flying weather officer is oc cupied in collecting hurricane data, radi operators like this one keep a steady strean of information flowing back to headquar ters. Flying weathermen ride herd on hur ricanes as cowboys ride herd on cattle o the range.

to complicate ground observation of the balloon.

The pibal has a known rate of ascent and, as it rises, the weather observer watches it through an apparatus known as a theodolite—a telescope-and-tripod arrangement that somewhat resembles a surveyor's transit. Through the theodolite the observer keeps tab on the balloon as it is carried aloft, and he plots its course at one-minute intervals. The wind velocity and direction at selected heights can be computed from the resulting chart.

At night the pibals carry a candle-and-lantern or an electric lighting unit, and it is surprising how long the tiny point of light can be seen as the balloon climbs and drifts with the winds.

The ceiling balloon, a first cousin to the pibal, is used by airport weather stations to determine the height of the cloud ceiling. This information is then relayed to pilots and is reported periodically over the teletype circuit that links the stations together. Red balloons are used when the overcast hangs low and black ones are used when the ceiling is higher. No theodolite is employed with ceiling balloons. At night the ceiling height is measured by means of a beam of light directed skyward.

When the weatherman wants to know even more intimate details about conditions aloft, he sends up an apparatus known as a radiosonde. This is a comparatively new wrinkle in meteorology and is not used as extensively as the pilot balloons. There are about half as many radiosonde stations in the United States and Alaska as there are stations that use pibals. Some of these stations make radiosonde observations once a day while others make them at twelve or six-hour intervals.

The radiosonde, which gets its lift by means of a gas-filled rubber balloon, consists of a small cardboard box packed with wires, batteries and radio gadgets. The outfit is cheaply built for, despite printed directions to return it to the nearest Weather Bureau office, most of them are never recovered.

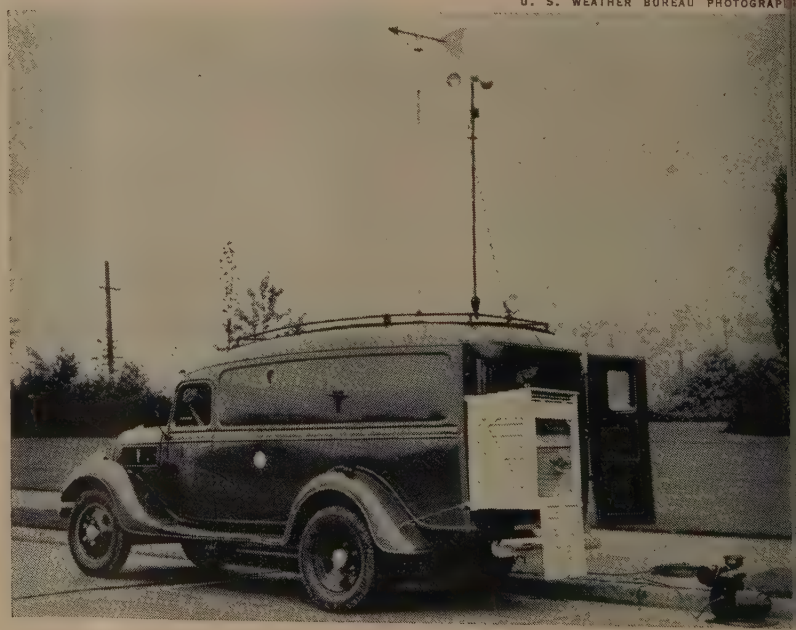
As the radiosonde rises, its radio transmitter sends out a series of signals. When received on the ground, these can be translated into temperature, pressure and relative humidity, while the balloon's drift indicates wind currents.

Eventually, the balloon bursts and the apparatus floats back to earth by means of a small, bright red parachute attached to a wicker framework. As a rule the outfit lands many miles from the point where it was released.

During the war these errant weather instruments started a number of mild invasion scares—and a few that were not so mild while they lasted. When a farmer, a field hand or a fisherman saw a red parachute, with a box attached, drifting down from the clouds toward him, his first thought would naturally be "enemy paratrooper" or "Jap balloon bomb."

There are literally thousands of official and unofficial weather observers dotting the countryside throughout the United States, and their reports are collected continuously by telephone, telegraph, tele

U. S. WEATHER BUREAU PHOTOGRAPH



A mobile weather station, traveling about complete with wind vane and anemometer, mounted atop, to measure the wind velocity.

ARMY AIR FORCE PHOTOGRAPH

All weather bureaus are linked together on teletype circuits and each station relays the information it collects to other stations. The operator here is using a teletype machine. The machine is equipped with a keyboard like a typewriter, but also has weather symbols on it. The messages appear in shortened form but liberally sprinkled with symbols to interpret.

type and radio. But even so, there are times when the weatherman wants to see things for himself. So, instead of sending out a pibal or a radiosonde, he makes use of a mobile weather station, mounted on a truck and ready to go anywhere.

On-the-spot weather information collected by these mobile weather stations is especially important in fighting a forest fire since the fire boss must know what to expect in the way of wind changes and possible rains. Most forest fires develop far from established weather stations. Thus, the man must go to the weather in such a case. The observer and his assistant, who is trained in radio, travel with the fire fighting crew and set up for business right behind the fire line. Using his own observations—made with thermometer, psychrometer, anemometer and all the other meteorological gadgets —plus weather information radioed in from other points—the traveling weatherman can make forecasts that are of great assistance to the fire fighters.

Should the weatherman want to study any particular phenomenon—eclipse, dust storm, volcanic eruption or what have you—his weather station on wheels is ready to take him there.

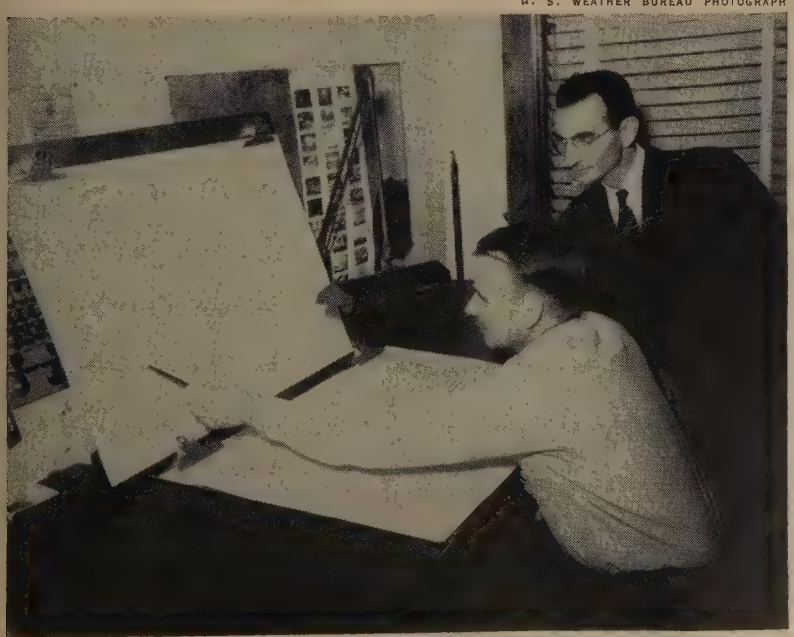
As for those tropical disturbances known as hurricanes, the weatherman must keep them under observation from the time they first develop as squally areas until they finally blow themselves out in some entirely different, and distant, section of the globe.

Until the last few years, the weatherman depended on hurricane reports from ships and from islands in the storm areas. He watched his own barometer, checked it against incoming reports and predicted accordingly. The main trouble was that captains, when they heard there was a storm in the offing, promptly took their ships out of the danger area as speedily as possible. As for the land stations—the storm usually wiped out all means of communication just at the time they were most needed.

Even so, the Weather Bureau's hurricane circuit got along pretty well until wartime radio blackouts cut off reports from ships and restricted the information given by land stations. But the Army and Navy recognized the importance of understanding hurricanes as well as all other kinds of meteorological conditions. A hurricane patrol was organized and special planes prowled the Atlantic and Gulf coasts throughout the hurricane seasons of the war years. This airborne hurricane patrol has been continued through 1945 and 1946 and its work is considered important to both aviation and meteorology in peace times.

During the hurricane season, which lasts roughly from mid-June to mid-October, the patrol planes take off whenever a storm area is reported. They scout the area and send back their findings, via radio. If the storm develops, the planes ride herd on it, circle it and even plunge into the middle of it. While the pilot battles to keep his ship under control, the weather officer on board takes careful observations. (Continued on page 330)

U. S. WEATHER BUREAU PHOTOGRAPH



By means of data collected in many ways from many sections of the country, these office-bound weathermen draw their maps and make forecasts.

The Yellow-Spotted Tree Salamander

Embryo within the egg.

By EDWARD C. DAY

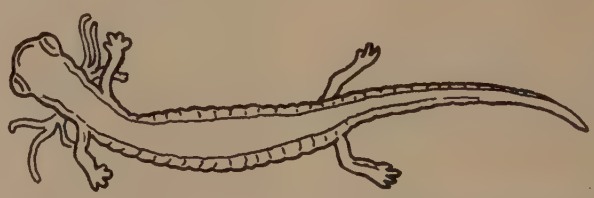
Illustrated by the Author

WHILE I was excavating a stump by a pool in a California rock garden, a male and female salamander were uncovered along with a couple of half-grown individuals and several eggs. The eggs were attached to rootlets in the damp earth, and the embryos were in an advanced stage of development, about ready to hatch. We brought the water-dogs and eggs home for study and observation.

The western tree salamander, *Aneides lugubris*, is not uncommon, but this was the first time we had discovered the eggs; and to them we devoted our first attention. The egg is about ¼-inch in diameter, round in shape, with an outer membrane that is transparent enough, after being cleaned off, to permit a sight of the embryo within. The embryo was already well formed, with head, eyes, mouth, legs, and tail, and, in addition, a set of gill filaments on each side of the neck. At first there was little bodily movement, but before long muscular contractions were observed in the limbs and tail. The embryo lay on its back, ventral side up with legs outspread and feet exhibiting four toes apiece, the abdomen bulging with yolk, and the tail curling over and touching the cheek. At occasional intervals the tail switched from the left side of the head to the right, and back again.

Just hatched. Circulation indicated by arrows.

After a day or two the eggs hatched and the little water-dogs freed themselves from the membrane of the egg and straightened out. They measured about ¾-inch in length; were darkly pigmented on the back, while the ventral side was a glossy, ivory white. Blood vessels coursed over the yolk-sac; since the flow of blood was from posterior to anterior, the vessels were evidently the vitelline veins. It was a pretty sight under the microscope to watch the circulation in the gill. The corpuscles move, single file, through the capillary in rhythmic pulsations at a rate of 60 to 80 per minute, running out along the anterior edge of a filament and returning along the opposite border.



Salamander able to creep and paddle. Below, a family of the water-dogs.

How far had embryonic development progressed when the heart first began to beat? None of the eggs were young enough to determine this. The somites had long since become metamorphosed into body tissues. If one could get eggs as soon as laid and follow development into primitive streak and early somite stages, it would be possible to learn how early this vital event occurs. The gills shrivel and disappear as soon as the yolk has been resorbed and the gap in the ventral body wall has closed. At length the little water-dog is able to roll over, creep about on land, and paddle in water in true amphibian style.

The adult salamanders were kept in a pan under a wet cloth for a time. One day when the cloth was lifted, we beheld a family scene of water-dog endearment. The male and female had their heads together as if in parental consultation, while two of the little puppies played about their tails. The adult is about five inches long, dark brown in color, and slightly speckled here and there with spots yellow in color.

What do tree salamanders eat? We dissected an adult that had escaped from the dish and died, and found in the contents of the alimentary canal shells of sow-bugs, and the horny mandibles and elytra of a beetle. Like frogs and toads, water-dogs are insectivorous and are therefore beneficial animals to have in the garden.

This salamander is a resident of western California, with a subspecies found on South Farallon Island. The animals are found both on the ground and in trees. Bishop, in his *Handbook of Salamanders*, reports that many of the salamanders "were found occupying the cavities in the 'live oak' trees, some at a height of thirty feet above the ground. The eggs have been discovered both in the soil and in the cavities of trees."

This pensive ring-necked duck seems in deep thought, perhaps because a round figure of 54,000,000 ducks and geese is reported by the U. S. Fish and Wildlife Service on the basis of its January count. This is a drop of 26,000,000 birds from the 1946 estimate. Reports from official and unofficial observers accent this drop. In the accompanying article we have further corroborating information. The author is the daughter of Dr. Alfred M. Bailey, Director of the Colorado Museum of Natural History, naturalist, photographer, and lecturer. Traveling widely with her father, she has had a splendid opportunity to observe the—

Ducks, Then and Now

By PATRICIA BAILEY

Photographs by Alfred M. Bailey and the Author

THROUGH the years I have been subjected to many field trips of one kind or another. My father has taken me on camera jaunts from coast to coast, and from the steep cliffs of Bonaventure Island off the Gaspe Peninsula, where thousands of white gannets nest, to the broad savannas of Florida and Louisiana. I have slapped mosquitoes in photographic blinds in the Bear River Marshes of Utah, while we waited for white-faced glossy ibises to return to their nests, and I have been burned by the sun of Monument Valley in the Land of the Navajo. This last season we headed south.

We had been traveling through the pine lands of eastern Texas, and finally reached the thriving port city of Orange. At last we were on the border of the marsh country, where my father had promised to show me great bands of ducks in the widespread savanna along the Sabine River. His stories of the past thirty years were of trips into the saw-grass country, long before the Sabine Refuge had been set aside. He told of white-fronted and Canada geese massed upon the burned marsh areas; of flocks of wild ducks of many species filling the skies.

We stopped to talk to Mr. Bancroft at Orange. He knew the marsh well from the old days, for he had extensive rice lands adjacent, which were raided regularly by bands of mallards and pintails.

"Where," father asked his old friend "shall I find some grain fields where we can photograph ducks?"

"Ducks—what are they?" Mr. Bancroft replied, and then went on to explain that in recent years the ducks had gradually dwindled in numbers, so that veteran hunters no longer considered it worth the time to try for a bag of game. When that happens the situation is truly acute.

We went on to Lake Charles and looked up John Le Blanc. He knew every foot of the marsh country to the southwest, and would be able to tell us where the birds were congregated. John merely shook his

Blue geese on the wing above the waters of the National Audubon Society's Rainey Sanctuary. The broad savannas of this refuge are one of the favorite wintering grounds of this species, which was represented by fairly large numbers of the birds.

head in an ominous gesture. "There are no ducks."

So we left the western part of Louisiana and headed for Vermilion Parish, where, twelve years before, I had visited Chenier au Tigre and the adjacent marsh country. I knew what we would find there, for even though I was small at the time, I remembered the masses of ducks on Belle Isle Lake, and the pintails crowding every pond on the sanctuary. We were so sure we would see birds that we had even written ahead to our friend Nick Schexnayder, superintendent of the Rainey Sanctuary, asking that he have a couple of blinds put up on the same places where father had photographed before—and to scatter a few sacks of rice to induce the birds to use the particular areas.

Yes, we were sure to find masses of wild fowl in Vermilion Parish, for that is the heart of the wintering ground of ducks and geese. Thousands of blue and snow geese winter on the broad-stretching savannas of the Federal, State, and Audubon sanctuaries. I could visualize the birds we should see, for I still recalled the great numbers that were observed on my former visit, when clouds of ducks raised from every pond.

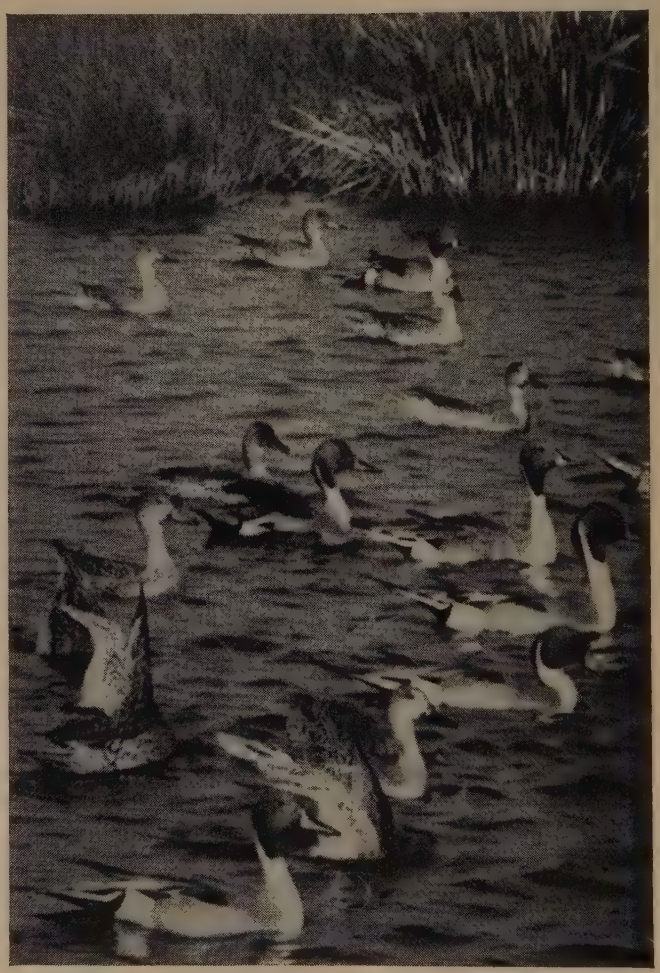
On that first trip, when I was only nine years old, we had traveled to the marsh country in the old *Widgeon*, crossing an arm of Vermilion Bay, and then chug-chugging down the narrow canal, its banks lined with waving cane.

Dr. T. Gilbert Pearson was at the Rainey Refuge and, with his kindly understanding of young people, taught me the fascinating art of catching crabs in the shallow waters of the boat landing, with a piece of meat for bait. With our lure submerged, we breathlessly waited for the pull, and then, while the crab held tightly, gently eased it into an awaiting dip net.

From the front porch of the Sanctuary, Belle Isle Lake extends toward the eastern horizon, and I recalled, massed across the expanse, flocks of ring-necked ducks, mallards and occasional canvasbacks. Belle Isle formerly was a special attraction to the diving birds because of the abundance of water roots upon which they fed. Nearby was a duck trap, and on my first visit hundreds of birds were being trapped and banded so that their migration routes could be charted. I remember that I watched, fascinated, as a metal bracelet was placed around the leg of a ring-necked duck, the band being moved gently up and down to make sure it was not too tight. And often they allowed me to hold the ducks and to liberate them. It was a grand experience for a youngster.

Father used an old-fashioned, crank 35-mm. motion camera in those days, and he stood in the blinds in the marsh, and ground out film of the pintails. Often I was allowed to accompany him, and watched the birds through a crack in front of the shelter as they returned to the pond, alighting on the far edge, and gradually coming closer. The handsome ducks tipped up with tails skyward, as they endeavored to get food on the bottom, and soon we had hundreds of birds busily feeding within a few feet of us.

And off the shores of the lake, just a stone's throw from the headquarters building, we photographed mallards and ring-necked ducks—hundreds of them massed before the blind. They made such a turmoil in the water as they splashed and dived, and were packed so closely together, that it was almost impossible to tell where one duck left off and another began.



Thirteen years ago pintail ducks were common throughout the marsh country of the Rainey Sanctuary of the Audubon Society. These are some of the birds photographed at that time.

Yes, we looked forward to our return to the marsh country with its hordes of ducks and geese. Nick met us at Inter-Coastal City, where wide-spread oaks were hung with gray Spanish moss, and we saw he had a new *Widgeon* to take the place of the old—a fast new Chris-Craft that sped across the shallow waters of the bay and into the canal. As we passed trappers' cabins, with muskrat skins stretched on frames to dry, we slowed our progress, so the waves from our boat would not wash the landings.

Then the headquarters building was reached, and as soon as we landed we ran eagerly around the building to scan the surface of Belle Isle Lake, where the photographic blind was dark against a mackerel sky. We wanted to see the ring-necks and mallards splash-

On the shores of Belle Isle Lake Dr. Bailey had this blind last November. He and his daughter saw only five ducks, yet from the same spot thirteen years before they had seen and photographed large numbers of canvasbacks, ring-necks, and pintail ducks. The duckless expanse of the lake above, in November, 1946, is in sharp contrast with the pictures at the left and below, serving graphically to accent the change that has taken place, and to pose the frequent question, "Where are the ducks?"

ıg for the rice that had been scattered for ıem. There was not a bird! Only clumps of ater hyacinths dotted the expanse of glisten- ıg water—not a duck was to be seen; none here there had been hundreds on my earlier isit.

And that is the story elsewhere, I am told, or there has been a gradual decline in the umber of ducks in the past five years, even ıough food conditions in southern marshes ave never been better. Trappers—skilled ıen who have lived their lives in the area—ıy there is not one duck where hundreds ere formerly found, and the same is true ver the great expanse extending from the Sabine iver on the Texas border, to the Mississippi.

We ran on, five miles down the canal, to the oak- rown ridge of Chenier au Tigre, which extends along ıe Gulf of Mexico for five miles, and we made our eadquarters with the Sagreras, who father has ıown for thirty years. The days on the Chenier ere a delight. The oaks were festooned with waving Spanish moss, cardinals darted from the dark shadows, and Carolina wrens and mockingbirds sang as though it were springtime, instead of winter.

We made long journeys with Simms Sagrera back into the marsh country, where we photographed thousands of blue geese feeding on the burns. We ranged on horseback all along the coastal prairie, and while there were ducks far back in the marshes, we

saw nothing like the numbers which should have been feeding in such ideal surroundings. The open lakes and ponds were there, the food supply was above normal, but the ducks had not come to the coast as in years past.

The reasons—well, that will have to be left to others. As for the remedy, I am not too sure. From what others tell me, it may not be too late to rebuild the duck population if the birds that nest in northern areas are given an opportunity to reach their wintering grounds. But as long as they are subjected to a barrage of gunfire on every marsh and lake, from the moment they are able to fly until finally a few succeed in reaching a sanctuary on the Gulf Coast, their fate seems hopeless. Being a sentimentalist, it would seem to me logical to try an obvious remedy, and that is for sportsmen not to kill ducks for a season or two. I have talked to many practical outdoors men who could scarcely be called *sentimentalists,* who take a gloomy view of the situation, and admit such a course is the only one, but that if treatment is delayed too long, our patient will not survive.

An Apple a Day

By MABEL IRENE HUGGINS

YOU WILL not find a single Jonathan or Delicious or Winesap or Grimes' Golden amongst the following twenty-four "apples." Although some of them are edible, others are so poisonous that, instead of keeping the doctor away, they would bring him on the run. Still others we would not think of eating.

In the four groups below, the definitions are not in the right order. Write the correct number in the blank in front of its proper "apple." Then turn to page 330 to reckon your score.

A

a. .... Love apple.

b. .... Apple of the eye.

c. .... Dead Sea apple.

d. .... Apple of Sodom.

e. .... Persian apple.

f. .... Balsam apple.

1. The citron *Citrus medica.*
2. A fruit supposed to turn to ashes when picked.
3. The tomato.
4. An East Indian vine of the gourd family.
5. A gallnut from Asiatic Turkey.
6. Something precious.

B

g. .... Apple shell.

h. .... Apple of Cain.

i. .... Adam's apple.

j. .... Shellapple.

k. .... Custard apple.

l. .... Star apple.

7. The voice box.
8. The chaffinch.
9. The North American papaw, *Asimina triloba.*
10. A tropical American tree, *Chrysophyllum cainito,* and its apple-shaped, edible fruit.
11. A fresh-water mollusk.
12. A European evergreen tree, *Arbutus unedo,* also known as the strawberry tree.

C

m. .... Egg apple.

n. .... Apple of Peru.

o. .... Cedar apple.

p. .... Apple of discord.

q. .... Potato apple.

r. .... Thorn apple.

13. A hard, brown, somewhat spherical growth produced by various rusts.
14. The Jimson weed.
15. The golden apple awarded to Venus by Paris.
16. The seed ball of the potato.
17. The eggplant.
18. Cape gooseberry, *Physalis paruviana.*

D

s. .... Hedge apple.

t. .... May apple.

u. .... Alligator apple.

v. .... Rose apple.

w. .... Melon apple.

x. .... Apples of Hesperides.

19. The mango melon.
20. The fruit sought for by Hercules—quinces or possibly oranges of Spain.
21. The large edible berry of a tropical tree, *Eugenia jambos.*
22. A North American herb, *Podophyllum peltatum,* having a poisonous rootstock.
23. Osage orange.
24. A small evergreen tree, *Annona glabra,* of south Florida and tropical America.

Common Galls of Woody Plants

By E. LAURENCE PALMER

Illustrated by M. Hope Sawyer

This is the forty-fifth in Nature Magazine's series of educational inserts.

MANY of us have read our Shakespeare and found him saying, "Let there be gall enough in thy ink," without associating his remarks in any way with some of the common distortions we so frequently find on common woody plants. Possibly we might assume that Shakespeare was using his celebrated two-edged sword, or more modern double-talk, when he used gall in that sentence. Perhaps he meant bitterness, but those of us who admire his phenomenal mastery of what men know can hardly refrain from feeling that he knew, as many of us do not, that we really do get many of the tannins used in ink from galls that are formed on such woody plants as some of our oaks.

The dictionary defines galls as swellings or excrescences of the tissues of plants, resulting from the attacks of certain parasites. There is no need to attempt to improve on that definition, although we might find analogies in the swellings produced in animals by the attack of certain parasites. A mosquito bite can hardly be considered as a gall, even though the swelling is caused in part by the insertion into our tissues of some foreign poisonous matter. To be strictly analagous with a plant gall, the mosquito or its offspring would have to live in the swelling produced by its bite, and, fortunately, this is not the case.

The organisms that cause common plant galls come from practically all of the major divisions of the lower plants and lower animals. We have galls formed by bacteria and by slime molds, by many of the fungi, and, if we consider the swelling caused by mistletoe as a gall, then we would have a gall caused by a flowering plant. Those of you who have read Dallas Lore Sharp's "Five Days and an Education" will remember the thrilling way in which he discovered his first mistletoe in New Jersey through inquisitiveness about the nature of a gall-like swelling high up in a gum tree.

Among the animal groups causing galls, we find a wide distribution. Nematode worms make many galls on some of our economic plants. These interfere with the returns we get from the culture of those plants. Some mites also, and many kinds of insects, make characteristic galls. Among the insects, we have common open galls made by aphids; others are made by gall flies or gall midges, gall wasps, gall beetles; not a few of the commonest are made by the caterpillars of some of our common moths. As a general rule, each of these creatures makes a gall of such form that the causal organism can frequently be identified more easily by the gall it makes than by an examination of the creature itself. We might paraphrase the Bible, and say that by their works we shall know them.

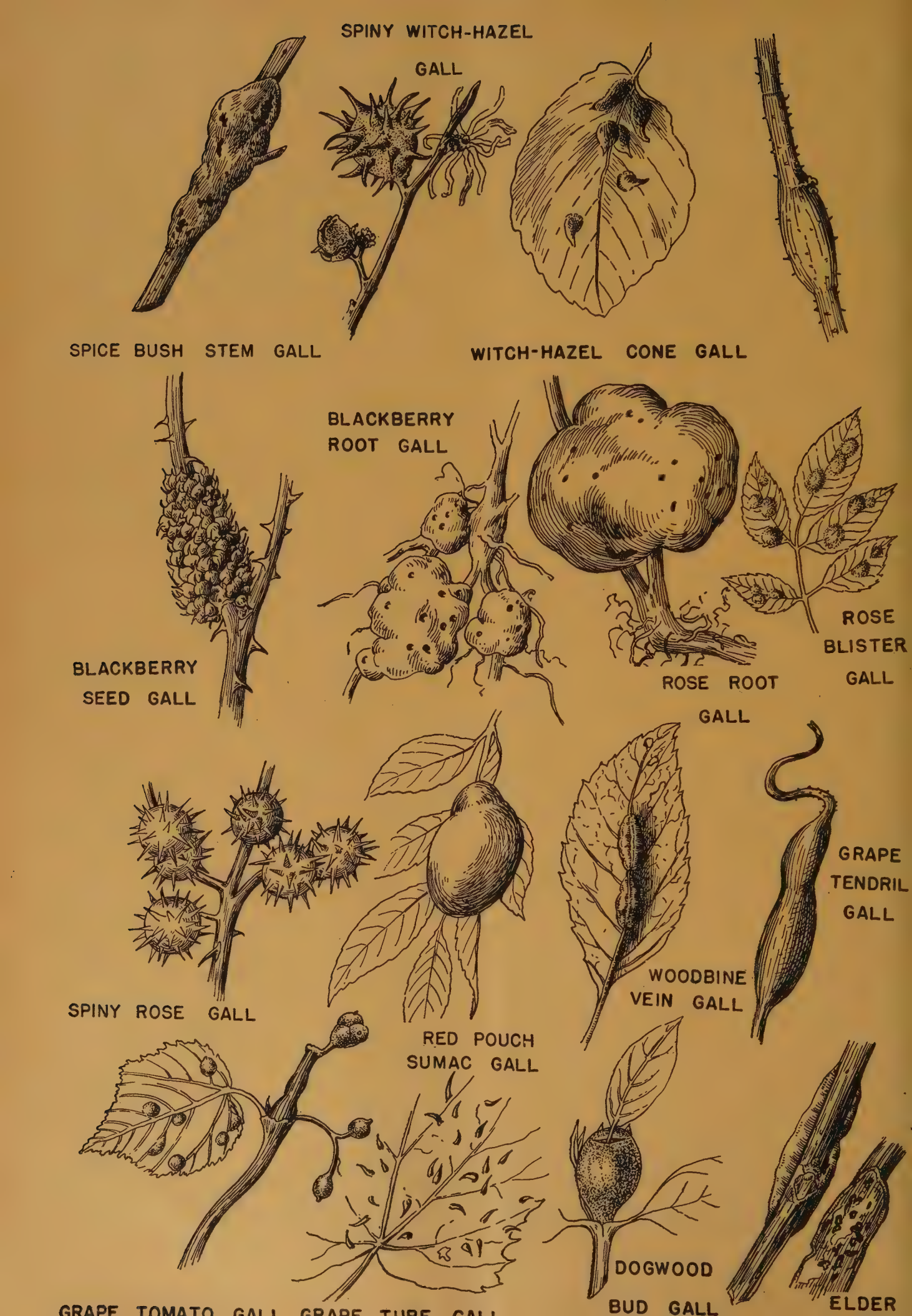
While there are a few organisms of the gall-making type that use as hosts different species of plants, for the most part we find them confining their efforts rather closely to a single species, or to a close relative of that species. In some cases, as you will see in these pages, there are a few that may make different galls on different plants at different stages in their life history, or different galls on one kind of plant at different stages in a life history. For example, an insect may lay its eggs in a bud, and galls may develop in the bud because of this attack, but after the egg has hatched the insect may move to another part of the plant and there form an entirely different kind of gall.

Not infrequently many individuals may make a colonial type of gall, the individuals in the colony coming, in some cases, from the offspring that developed from a single egg, or, in other cases, from the offspring that developed from a clutch of eggs laid at one time and place. Aphid galls, such as one finds in the spiny structures on witch hazel, or the galls that look like little cones on spruce, may be of this type. Again, we may have a colonial type of gall in which two entirely different kinds of creatures are involved. As the descriptive notes show, the pinecone willow gall, so conspicuous on some willows in winter, may be colonial in that the original gall was formed by a creature that attacked a bud, but the resulting scales that developed the cone provide an excellent shelter for other creatures that take advantage of the opportunity provided.

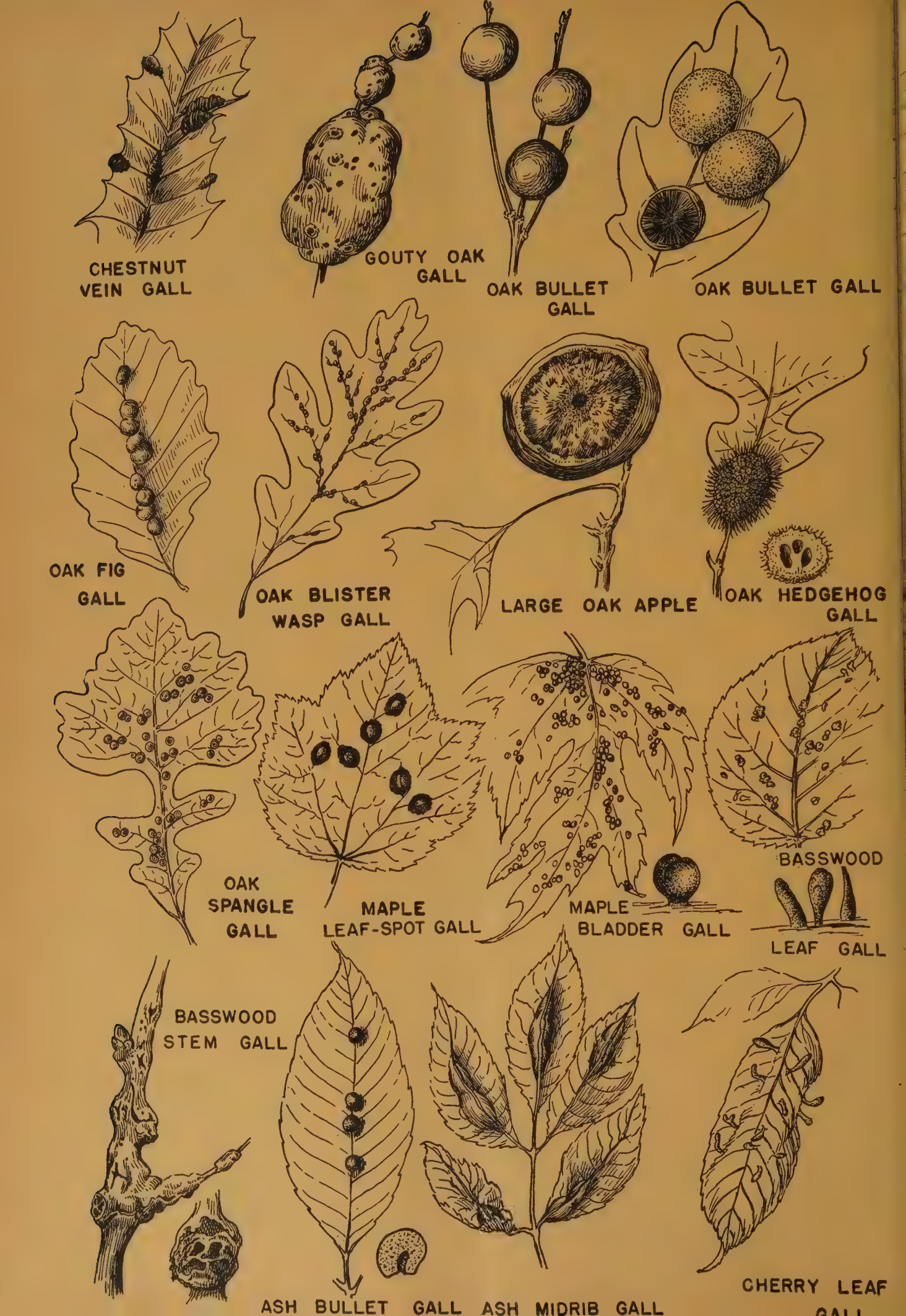
We have a lot of problems to face if we wish to become gall fans. Do we want to learn all the galls that are found on oaks, for example, or do we want to be able to recognize all galls in our neighborhood that are caused by the caterpillars of moths, irrespective of the kinds of plants involved? Again, we might wish to become specialists in bud galls, in stem galls, in leaf galls, in root galls, in open or closed galls, or in colonial or individual galls. We may be economically minded, and plan to know something about the control of those organisms that cause injurious distortions of economic plants. Many of these seriously injure the market value of vegetables, of commercial flowers, or of horticultural stock used in landscaping. Effective control measures may be of considerable value to society.

Just as there are "fans" who develop outstanding interests in sea-weeds, algae, cactuses, garden flowers, mosses or other groups, so there are gall fans. Some of them go into the study for the fun of it; others make a business of it; still others mix business and pleasure. Some have put their findings into published form where you and I may share their discoveries.

The late Ephraim Porter Felt, a former state entomologist of New York, contributed much to the literature of galls while he held that position. His state bulletins on that subject are among the (Continued on last page of this insert)


SPINY WITCH-HAZEL
GALL
SPICE BUSH STEM GALL
WITCH-HAZEL CONE GALL
BLACKBERRY
ROOT GALL
BLACKBERRY
SEED GALL
ROSE
BLISTER
GALL
ROSE ROOT
GALL
GRAPE
TENDRIL
GALL
WOODBINE
VEIN GALL
SPINY ROSE GALL
RED POUCH
SUMAC GALL
DOGWOOD
BUD GALL
ELDER
GRAPE TOMATO GALL GRAPE TUBE GALL

A Gall on Spice Bush		
Spice-bush Stem Gall. Caused by gall midge, *Lasioptera linderae.*	Formed on the stem of the common spice bush, being developed in summer but persisting.	Irregular gall with infection mostly just under the bark rather than in the wood; to one inch long.
Some Galls on Witch Hazel		
Spiny Witch Hazel Gall. Caused by aphid, *Hamamelistes spinosus.*	Found on buds of witch hazel, the organism migrating from birch to witch hazel and back, in early summer.	Green or red, many-spined, egg-shaped, bud gall to nearly an inch long, with openings for escape.
Witch Hazel Cone Gall. Caused by aphid, *Hormaphis hamamelidis.*	Found on leaves of witch hazel on upper side, with opening on under side. Aphids migrate from birch to witch hazel.	Green or red cones on upper leaf surface, with a fuzz-bordered opening on under side; to ½ inch high.
A Raspberry Gall		
Raspberry Cane Girdler. Caused by beetle, *Oberea bimaculata.*	This may be highly destructive to raspberries, causing canes to break and reducing yield of fruit.	An irregular swelling that is girdled above and below; to 1 1/3 inches long.
Galls on Blackberry		
Blackberry Seed Gall. Caused by gall wasp, *Diastrophus cuscutaeformis.*	On the stems of blackberry, dewberry, sand blackberry and some related species.	Clustered, seed-like, red or green galls encircling the cane of the host plant and injuring it severely.
Blackberry Root Gall. Caused by gall wasp, *Diastrophus radicum.*	On the rootstalks of blackberry, being formed in summer, but persisting through the year.	Irregularly clustered, brown galls distorting the growth of host plant badly; to one inch through.
Some Galls on Rose		
Rose Blister Gall. Caused by gall wasp, *Diplolepis rosaefolii.*	Found on buds, roots, stems and leaves of roses, but probably most noticed on the leaves.	Bean-shaped swellings with openings on both leaf surfaces; to ⅛-inch through; formed in summer.
Spiny Rose Gall. Caused by gall wasp, *Diplolepis bicolor.*	Fairly common and relatively widely distributed, with many similar galls on rose caused by other organisms.	Prickly, yellow-green, or red globes on the twigs in clusters of 2 to 10; to 3/5-inch through.
A Gall on Woodbine or Virginia Creeper		
Woodbine Vein Gall. Caused by gall midge, *Dasyneura parthenocissus.*	Formed in summer when the midge flies and lays its eggs. Gall develops on midrib of leaf.	Appears as a swollen midrib with a length of about ½-inch; irregular, sometimes winged.
Some Galls on Grape		
Grape Tendril Gall. Caused by gall midge, *Asteromyia petiolicola.*	Found on tendrils of grape being formed in summer when causal midge flies.	Oval, largest away from the base of the plant and usually irregularly developed as a coarse spindle.
Grape Tomato Gall. Caused by gall midge, *Lasioptera vitis.*	Formed in the summer on leaf or tendril of grape, causing blister-like swellings that persist.	Irregularly lobed, red or green to ¾-inch in diameter, mound-like when on leaf, broad spindle on tendril.
Grape Tube Gall. Caused by gall midge, *Cecidomyia viticola.*	Formed on leaves of grape in summer often in great abundance and usually not too crowded in one spot.	Long, red or green, pointed, cone-shaped galls, to over 1/3-inch long and about three times as long as thick.
A Gall on Dogwood		
Dogwood Bud Gall. Caused by gall midge, *Cecidomyia sp.*	Found on the buds or leaf-bases of alternate-leaved dogwood, or on other species of dogwood; summer.	Juicy, red-tinted gall that appears at the end of shoots, to ¾-inch long, often rather egg-shaped.
A Gall on Elderberry		
Elder Stem Gall. Caused by gall midge, *Neolasioptera sambuci.*	In addition to this gall on stems of elderberry, there are others on the flowers and leaves.	Irregular gall, formed for the most part just beneath the bark, to over an inch long, with a number of openings.


CHESTNUT VEIN GALL
GOUTY OAK GALL
OAK BULLET GALL
OAK BULLET GALL
OAK FIG GALL
OAK BLISTER WASP GALL
LARGE OAK APPLE
OAK HEDGEHOG GALL
OAK SPANGLE GALL
MAPLE LEAF-SPOT GALL
MAPLE BLADDER GALL
BASSWOOD LEAF GALL
BASSWOOD STEM GALL
ASH BULLET GALL
ASH MIDRIB GALL
CHERRY LEAF GALL

Some Galls on Chestnut

Chestnut Vein Gall. Caused by gall midge, *Cecidomyia castaneae.*	As chestnut vanishes this gall will of course become decreasingly common.	Spindle-shaped, greenish-brown galls that are to 1/5-inch wide, and found on leaf veins, usually distorting the leaf.

Some Galls on Oak

Gouty Oak Gall. Caused by gall wasp, *Plagiotrochus punctatus.*	Found on black oak, red oak and scarlet oak, the causal insects flying in June or early summer. To 4 inches long.	Appear as irregular dark swellings of the twigs, with numerous openings through which wasps have escaped.
Oak Bullet Gall. Caused by gall wasp, *Disholcaspis omnivora.*	This gall is common on a number of different kinds of oaks, with little variation in appearance.	Appear as spherical, yellow-brown twig-swelling, sometimes to nearly one inch in diameter.
Spotted Oak Apple. Caused by gall wasp, *Cynips centricola.*	Found on under side of leaves of post oak, being most conspicuous in the fall months but persisting through winter.	Spherical, thin-shelled, with thread-supported, hard center, sometimes pink-tinged and covered with white bloom; 4/5-inch.
Oak Fig Gall. Caused by gall wasp, *Xanthoteras forticorne.*	Found on leaves of white oak and of chestnut oak, basket oak and chinquapin oak in summer and fall.	Yellow, thin-shelled, often soft galls crowded or pressed together on twig or vein of the leaves.
Oak Blister Wasp Gall. Caused by gall wasp, *Neuroterus niger.*	Found on bur oak, or on white oak, on both sides of the leaves, but more conspicuous on the upper side.	Spherical, one-celled blisters along the veins, showing small nipple on those on the lower surface.
Large Oak Apple. Caused by gall wasp, *Amphibolips confluens.*	On scarlet oak and black oak, developing for the most part in May and June but persisting into the late fall.	Spherical, juicy, smooth, spongy, inside with a hard central cell supported by loose sponge, to 2 inches through.
Oak Hedgehog Gall. Caused by gall wasp, *Acraspis erinacei.*	Found on the leaves of white oak, with sexual generation making gall on buds in early spring. Winters in buds.	Appear as netted, cracked or broken spheres to ½-inch in diameter, densely covered with spines; colonial.
Oak Spangle Gall. Caused by gall midge, *Cecidomyia poculum.*	Found on leaves of white oak and of bur oak, most commonly on tissue away from the veins and usually scattered.	Small, saucer-shaped clustered galls, rarely to ½ inch in diameter, on under leaf-surface.

Same Galls on Maple

Maple Leaf-spot Gall. Caused by gall midge, *Cecidomyia ocellaris.*	Found on leaves of red maple, resembling eyes, scattered, centered usually on secondary veins, but not always.	Yellow, eye-like galls, with distinctly red margins, to 1/6-inch in diameter, relatively flat, blister-like.
Maple Bladder Gall. Caused by gall mite, *Phyllocoptes quadripes.*	Found well scattered, but often very numerous on the leaves of silver maple.	Appears like a small bladder-like blister, largest at top, red, to 1/10-inch through on upper leaf-surface.

Galls on Basswood

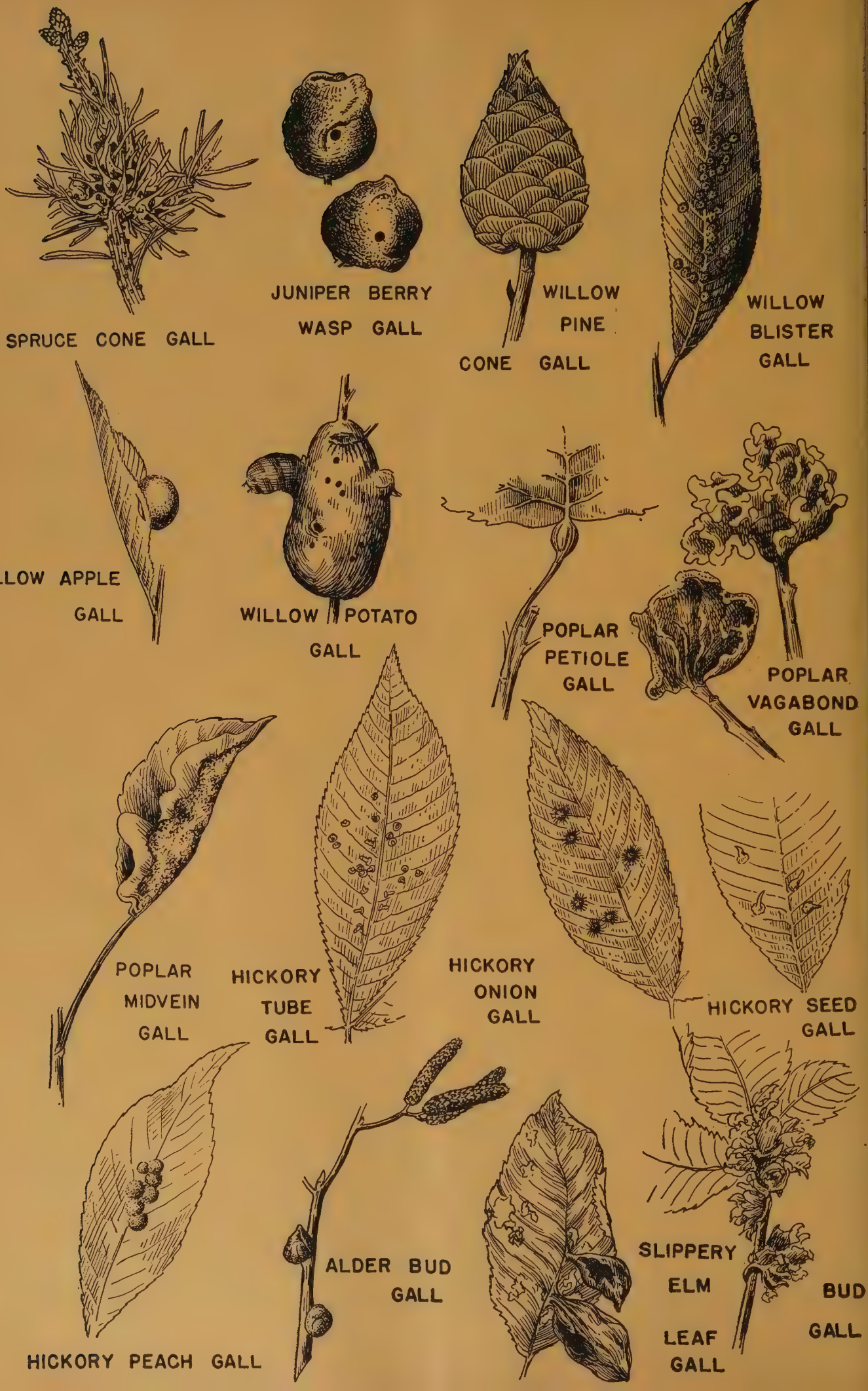
Basswood Leaf Gall. Caused by gall mite, *Eriophes abnormis.*	On leaves of basswood, sometimes being very abundant and conspicuous, even at a distance.	Top-shaped, greenish galls, on upper leaf-surface, to 1/10-inch through, cylindrical, pointed or blunted.
Basswood Stem Gall. Caused by gall midge, *Cecidomyia citrina.*	Found on the twigs and the leaf-stalks of basswood in summer or winter.	Irregular, distinctly broken or ruptured swellings, to 1/3-inch in diameter, perforated when old with escape holes.

Some Galls on Ash

Ash Bullet Gall. Caused by gall midge, *Cecidomyia pellex.*	Found on leaflets of ash, being developed for most part in summer but persisting through fall.	Angularly spherical leaf gall relatively hard, but with a central chamber; usually on veins of leaflets.
Ash Midrib Gall. Caused by gall midge, *Contarinia canadensis.*	Found usually on the mid-rib of the leaves of white ash, being developed mostly in summer.	Relatively large, midrib gall, plump, spindle-shaped, to 2/3-inch long, and about 1/3 as wide.

A Gall on Cherry

Cherry Leaf Gall. Caused by gall mite, *Eriophyes padi.*	Found on the leaves of wild black cherry, being formed in summer. Known also as Cherry Pouch Gall.	Stemmed, tubular, pale green or red, to ½-inch long, slender, irregularly cylindrical, on upper leaf surface.


SPRUCE CONE GALL
JUNIPER BERRY WASP GALL
WILLOW PINE CONE GALL
WILLOW BLISTER GALL
WILLOW APPLE GALL
WILLOW POTATO GALL
POPLAR PETIOLE GALL
POPLAR VAGABOND GALL
POPLAR MIDVEIN GALL
HICKORY TUBE GALL
HICKORY ONION GALL
HICKORY SEED GALL
HICKORY PEACH GALL
ALDER BUD GALL
SLIPPERY ELM LEAF GALL
BUD GALL

	A Gall on Spruce	
Spruce Cone Gall. Caused by an aphid, *Adelges abietis.*	Found on Norway spruce from early summer through the year, developing with the new shoots of the year.	Appear like green cone-like structures, with holes at the base of each needle, through which aphid can escape.
	A Gall on Juniper	
Juniper Berry Wasp Gall. Caused by a chalcid wasp.	Causes abnormal, infertile, thickened berries or cones, some juniper galls being formed by midges, mites, etc.	The thickened fruit usually has a hole or holes through which causal organism made its escape.
	Some Galls of Willow	
Willow Pine-Cone Gall. Caused by gall midge, *Rhabdophaga strobiloides.*	Conspicuous particularly on pussy willow when leaves are off; formed in early spring or summer.	Pine-cone-like galls at end of willow twigs, gray, to one inch long, often with secondary insects between the "scales."
Willow Blister Gall. Caused by gall midge, *Oligotrophus salicifolius.*	Affects both sides of the leaves, but mostly beneath; formed in early summer. Mites and sawflies also cause galls.	Yellow, red-spotted, flattened galls that may be to 1/10-inch through, with spot in center.
Willow Apple Gall. Caused by gall wasp, *Pontania pomum.*	Fairly conspicuous galls formed on leaves of willow in the spring when leaves are developing.	Yellowish-green, fleshy, rosy-cheeked galls, rounded, on upper leaf-surface, to ½-inch in diameter.
Willow Potato Gall. Caused by gall midge, *Rhabdophaga batatus.*	One of many common galls on twigs of willow. This one develops in spring or early summer.	Irregular, potato-shaped galls, to sometimes nearly an inch through, on twigs and often with many openings.
	Some Galls of Poplar	
Poplar Petiole Gall. Caused by aphid, *Pemphigus populicaulis.*	Other galls on poplar are caused by beetles, mites, wasps and flies.	Nearly spherical swellings at juncture of leaf stalk and leaf-blade; ridged, rather conspicuously; open.
Poplar Vagabond Gall. Caused by aphid, *Mordwilkoja vagabunda.*	Conspicuous in late summer, fall or winter at twig tips of different poplars, formed in summer.	Twisted and folded mass of leaf and twig tissue, with diameter to 2 inches and many openings through which aphids escape.
Poplar Midvein Gall. Caused by gall midge, *Cecidomyia sp.*	Midges working on poplars produce a variety of type of folded and distorted leaves.	Swellings produce a folding together and dwarfing of the leaves usually in the center portion primarily.
	Some Galls of Hickory	
Hickory Tube Gall. Caused by gall midge, *Caryomyia tubicola.*	These tubes that appear on hickory leaflets are frequently characteristically clustered.	Greenish-black, cylindrical galls that are to 1/5-inch wide, and about 5 times as wide as thick.
Hickory Onion Gall. Caused by gall midge, *Caryomyia holotricha.*	Developed, primarily in the summer months, on the under side of the leaflets of hickory.	Thin-walled, red spheres, covered with relatively long, straight hairs, to ¼-inch in diameter, persistent.
Hickory Seed Gall. Caused by gall midge, *Caryomyia caryaecola.*	Found in groups on the midribs of the leaflets of bitternut hickory, developing in summer.	Greenish-red, slender, smooth cones on a globular or swollen base, to 1/6-inch long, and nearly as wide as long.
Hickory Peach Gall. Caused by gall midge, *Caryomyia persicoides.*	Develop in the summer months on the veins of leaflets of hickory, in clusters that are crowded.	Brownish, downy spheres found on many leaves of a given tree, thick-walled, to 1/3-inch in diameter.
	Some Galls of Alder	
Alder Bud Gall. Caused by gall midge, *Dasyneura ulmifusus.*	Found developing in the buds of alder in spring. Beetles and mites form other alder galls.	Nearly conical galls, necessarily somewhat separated but may be to ½-inch through, and therefore conspicuous.
	Some Galls of Elm	
Slippery Elm Leaf Gall. Caused by aphid, *Gobaishia ulmifusus.*	Formed during the summer, when the sacks become inflated aphid shelters.	Hollow sacks on upper surface of leaves to over 2/3-inch long. Identifiable after leaves have fallen.
Slippery Elm Bud Gall. Caused by gall midge, *Dasyneura ulmea.*	Formed during summer, but obvious in spring and winter, condition serving as hint of the species of elm.	Aborted or enlarged buds in scales tipped with rusty hairs become more obvious than in normal condition.

(Continued from first page of this insert)
most useful we have. Much in them has been reprinted in *Plant Galls and Gall Makers* by the Comstock Publishing Company of Ithaca, New York. The Slingerland-Comstock Company, of the same city, issues a smaller, fifteen-cent booklet, on which this insert is largely based. It gives assistance on the identification of some galls found on herbs, data that could not be here included. The late Frank E. Lutz of the American Museum of Natural History published one of the most useful of all popular insect books, in the Putnam series. In it there is an excellent chapter on plant galls. Dr. Alfred Kinsey of Indiana has long been an able gall specialist, and his publications should be sought if you wish to take up the study of galls seriously. The detail with which he has recorded his observations of representatives of some groups of gall makers is hardly matched by the work of others in the field. This, of course, is not the only field in which this able biologist has distinguished himself.

At the beginning of this article we suggested some commercial value of the work of galls, such as the making of ink. It happens that there is a gall-former, *Cynips gallae-tinctoriae,* in the region between Europe and Asia, whose galls yield a permanent writing fluid or indelible ink. It is not surprising that such a material may find use in the making of permanent, non-fading dyes. A related insect forms a gall on oak that yields a high percentage of tannin, useful in the tanning of hides and the making of leather. The cost of production is so much higher in America than in the Old World that, even though we may have galls that compete with the European kinds in the production of tanning materials, we are not likely to try to compete with the European source of supply unless the economy of that part of the world goes sky high, as seems possible in the present state of affairs.

Not a few of the galls have some food value. Some oak galls in our middle West are sought as food by some of our domestic animals, and others are known to serve as food for such wildlife as grouse, particularly when competitive food is not available in abundance. "Black-oak-wheat" and "wheat-mast" are examples of galls that may figure in an important way as food for animals that, in turn, have food value to us.

Some of the galls of the mint family—not here considered—are rather famous for the concentration of fragrant oils they produce. Some of these are used in flavoring foods, while others are used primarily as scent producers. Still other gall insects, such as that living on oak, produce a gall that exudes a sweetish honey dew that is sought by ants and by honeybees. The latter, of course, use it to some extent in the production of honey.

While it is true that many galls yield relatively small amounts of materials of commercial value, in the aggregate they make a substantial contribution to our economy. Some of them yield products for which we have discovered special uses, duplicated from other sources. Some of the finer grades of lambskins may be tanned more satisfactorily, apparently, with tannins produced by galls than by other equally available materials.

There are a number of simple techniques of study. These may sound too simple to be worthy of mention, but they are often overlooked. For example, it would be absurd for you to go into the fields or woods about your home and attempt to collect, today, samples of the organisms that cause the galls you may find. They may be active and free for only a few days in the year, even though the galls may be there the year round. Of course you are not going to stand beside a gall for 364 days to have the pleasure of seeing a minute gall midge come out on the 365th day. Besides, it may come out at night, or when it does come out it may be too small for you to see. The simplest way to get around such a difficult situation is to set a trap for the animal. All you do is slip the specimen you collect in a bottle, take it home with you and put a cotton cork in the bottle. Then, when the animal comes out, you will have it safely trapped in your bottle.

This bottle system has its weaknesses in that the plant may not be carrying on the normal functions essential to the proper development of the gall parasite, so you may keep your specimen for a long while and get no results whatever. You can get around this by taking a short piece of glass tube. We use the tubes in which photographic developer commonly is packaged. Slip the tube over the twig that bears the gall. Plug the ends of the tube with cotton in front of and behind the gall. Go away and forget your troubles for a while. When you have the opportunity, make a visit to the trap every once in a while to take a look at it. Eventually you should find that the animal you wish has emerged, and you will have it for a specimen.

I am sure that you are intelligent enough to know that you will not get an insect from every gall on which you set a trap. If the gall is formed by a mite, a worm, a fungus, or by bacteria, you could not possibly get an insect from it. For our purpose I think it will be best if we suggest that, as beginners, your studies center around those galls that are caused by insects. For that reason most of the galls selected for this insert are insect-caused.

I might warn you in advance by suggesting that, if you begin a study of insect-caused galls, it is quite possible for you to become infected with an energy-consuming disease—the disease of wanting to know more and more about these tremendously interesting little climates that so many kinds of animals make for themselves out of the environment in which they live. We take stones and wood and earth and make homes in which we can live comfortably. We need not think that we alone have this ability. But really we can hardly match for our own needs what gall makers do in meeting the needs they must meet to survive. Try knowing them better and you will find life will always be interesting.

As We See It

Too High a Price

WE SUPPOSE that if we consulted the War Department—which we do not intend to do—we would be told that it is a wise general who knows when to retreat. In conservation, however, we incline to the tactical techniques of Balaklava, Belleau Wood and Bastogne. We believe that attack in the face of odds, a determined defense, or fighting to the last man should be the order of the day. For that reason we cannot go along with the National Park Service in its proposed elimination of certain areas from the Olympic National Park. We regard these eliminations as retreat in the face of the enemy.

It is not our desire to attack the National Park Service in this instance. It and the public are faced with tremendous pressures from those enviously eyeing the timber trees of the Park. So the Service has chosen a course and adopted a proposal that represents its view of expediency in the circumstances. That this plan is put forth as a rectification of the boundaries in the interests of easier administration of the Park does not alter the case, or, in our opinion, effectively throw a protective smoke screen about the actual retreat.

Briefly, the eliminations would exclude 56,000 acres of land supporting two and one-half million board feet of merchantable timber. Part of this land exclusion could be justified on the grounds of administrative wisdom, or because private holdings and pre-park development render the area unmanageable. This justification does not, we feel, apply to the splendid wilderness of the Bogachiel, which, above all, should not be conceded to the pressure of special and selfish interests.

More than any consideration of relative importance of individual tracts, however, we feel that one reason stands out above all else as against this retreat. This is precedent. In our view this proposal represents admission that National Park areas are not inviolate; a concession that private and special interests may prevail over the greater public interest. Where would such a trend stop? It would not stop, and would open the door to continued and growing nibbling at the National Park areas—for power, irrigation, mining, grazing, lumbering and other purposes. Loosing such a flood is too high a price to pay for the appeasement of a few lumbermen in the Northwest.

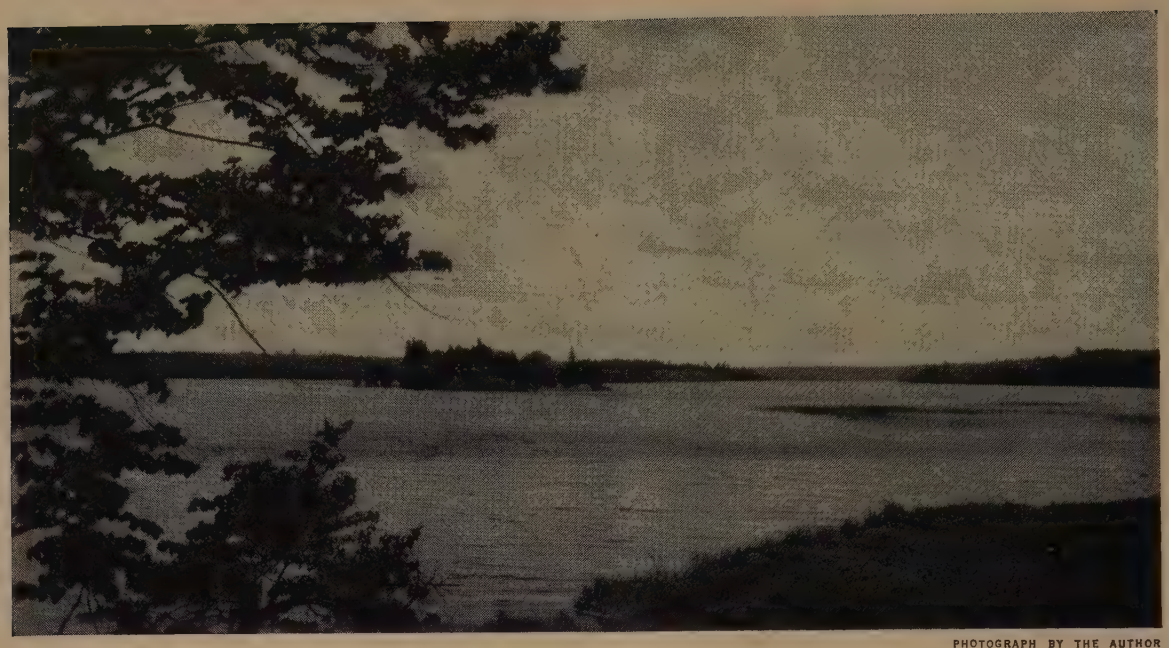
Fooling the Public

UNDER a Boston dateline the Associated Press carried a story saying: "Erection of new outdoor advertising billboards will not be permitted in open country or residential areas in Massachusetts after next Friday under a ruling made yesterday by the state outdoor advertising authority. Members of the authority said that to their knowledge Massachusetts is the first state in the nation to make such a ruling. The authority said new billboards will be permitted only in the state's business areas."

The first sentence of this propaganda, put over on the august Associated Press, is as sweeping as it is specious. The catch is in the last sentence. Massachusetts, as recorded earlier in our pages, recently had an overhauling, of a sort, in its outdoor advertising control set-up. Administration of the excellent State law had become so industry-ridden as to be a stench. So the administrative picture was changed, without changing the personnel responsible for the administration—or its views and prejudices. The viewpoint of the Massachusetts Outdoor Advertising Authority is that almost anything constitutes a "business area"; it ignores the set-back of billboards provided in the law; it reserves the right to decide itself whether a billboard is offensive.

The sweeping claim in the newspaper story from Boston does not mean a thing. It is, however, part of the billboard industry's current attempt to throw a halo of holiness about its "new code." This code defines a "business area" as: "Any area which is commercial, industrial, marketing or mercantile, or on *commercial arteries* and *adjacent to commercial enterprises*." The italics are ours, and the reason for them should be obvious to anyone who can read English. A highway connecting two cities, even fifty miles apart, has always been considered a commercial artery. Thus the lovely new billboard code would extend rather than restrict the industry's avowed right to erect rural billboards.

In order to sell its "new code," the industry has set up Standard Outdoor Advertising, Inc., which is the same leopard with the same old spots. This new stalking horse makes a lot of pretty promises about sticking to "recognized commercial areas," staying out of "strictly residential areas"; erecting billboards with due respect to scenic views, all the while contending that a billboard can only be considered objectionable when it actually hides the view. All these promises mean nothing, because the decision as to what is proper will be made by the industry. Some people are going to be fooled by this latest sanctimony. We are not, for we have seen the industry's chicanery too long.



PHOTOGRAPH BY THE AUTHOR

Schoolcraft Island in Lake Itasca, Minnesota, named for Henry R. Schoolcraft, ethnologist and Chippewa Indian Agent, who, in 1832, discovered the source of the Mississippi River at the north end of the lake.

"Ol' Man River's" Source

By MILDRED J. ERICSON

WHERE the mighty Mississippi River starts its winding, 2552-mile journey to the Gulf of Mexico lies a clear, pine-bordered lake with twelve miles of jagged shoreline in the "land of sky-tinted waters"—Minnesota. This is Lake Itasca, "Ol' Man River's" source, in Itasca State Park, a 32,000-acre wilderness where wild deer, bears, beavers, muskrats, raccoons, foxes, and coyotes abound, where tamarack and spruce bogs hold treasures of gorgeous orchids and peculiar insect-eating plants, where pike and bass leap for insects at dusk, and the weird cries of the bald eagle and loon break the stillness of this northern woodland.

Henry R. Schoolcraft, ethnologist and Chippewa Indian Agent, is accepted as the discoverer of the headwaters of the Mississippi River. Schoolcraft, in 1832, headed a Government mission among the Chippewas. This mission had a secondary objective, that of determining the true source of the great river. The expedition, guided by the Indian, Yellow Head, reached Lake Itasca on July 13, 1832, and the American flag was run up on a small island in the lake. This spot of land has since been designated as Schoolcraft Island.

PHOTOGRAPH BY W. L. MILLER

The author stands by the marker that records the source of the Father of Waters.

Itasca is not an Indian word, as many believe. According to the best evidence, Schoolcraft formed the name Itasca from parts of two Latin words meaning "true" and "head"—ver (itas ca) put.

In 1891 the Minnesota Legislature established Itasca State Park, principally to protect the lake and its surrounding small stand of primeval pine forest. The park was, at first, largely on paper, because most of the land in the present seven mile by seven mile area was privately owned. Before the land could gradually be acquired much of it was cut over, but since final acquisition by the State the forces of Nature have been allowed to work, changing materially the original pine character of the exploited areas. However, most of the

ark seen by the average visitor is in virgin pine, hich, indeed, is threatened, as the years pass and ines reach maturity, by invasion of other species. ntensive forest management to preserve the original haracter of the area is urged in some quarters.

Itasca was one of the first in the family of state arks, and one of the largest. Jacob V. Brower is nown as the father of the park. Near the picnic rounds a bronze plaque on a boulder bears the in- cription:

"Jacob V. Brower explored the Itasca basin in the all of 1888 and was commissioned by the Minnesota Historical Society in February, 1889, to conduct an fficial survey of the area. Largely as a result of this etailed exploration of the sources of the Mississippi iver, especially in 1889 and 1891, Itasca State Park as established by an Act of the Minnesota legisla- ure in 1891. Brower was named the first commis- ioner of the park."

For the botanist this area is most interesting be- ause of the variety of plant communities—floating ogs, sphagnum and tamarack bogs, white cedar wamps, spruce and birch forests, mixed deciduous nd pine forests, solid jack pine forests, and the cli- nax type, virgin Norway pine. Each community is ccompanied by its own interesting ground cover. Iosses, lichens, and fungi are abundant on fallen logs.

Two insect-eating plants—the pitcher plant and undew—grow in the sphagnum moss. A third, the

PHOTOGRAPH MINNESOTA CONSERVATION DEPARTMENT

Many pairs of beavers are busily at work building their homes and dams in Itasca State Park.

PHOTOGRAPH BY JOHN DOBIE

Showy ladyslipper is one of the many beautiful wild flowers found in the woods and bogs now protected by Itasca State Park.

bladderwort, is found in the shallow water. These northern bogs are also the home of one of our most beautiful wild flowers, the showy pink and white slipper, Minnesota's State Flower. This orchid, often reaching the height of three feet, blooms during June.

In the shallow water along the margin of the lake, wild rice raises its graceful stalks. The Indians harvest heavy crops of wild rice in their light-weight canoes. According to a popular belief the famous birch bark canoes of Indian make are so tippy that the voyager has had to part his hair in the middle and think of even numbers to balance the canoe! At the town of Cass Lake some fifty miles away is the only wild rice elevator in the country.

Four pines are found in Itasca—the Norway or red pine, white pine, jack pine, and porcupine! Seriously, some of our finest stands of virgin Norway and white pine are located in Itasca Park. Many of the arrow-straight Norway pines, with reddish, flaky bark, are more than 100 feet tall.

The white pine, with black, ridgy bark, is valuable commercially. In fact, the timber in Itasca is valued at $2,000,000. The jack pine is also known as the scrub or firepine, the knobby cones of which usually do not open to release the seeds unless a forest fire sweeps the timber. Other conifers that grow in Minnesota's largest state park include the balsam fir,

PHOTOGRAPH BY THE AUTHOR

Everybody does it! Visitors to Itasca State Park walk on stepping stones across the Mississippi. At least that is the effect, for it is here that the great river starts on its way to the Gulf of Mexico.

black spruce, white spruce, white cedar, red cedar, and tamarack. The tamarack, the only conifer to shed its needles in the fall, grows in the cold, acid soil of the bogs. These numerous bogs are fascinating places to visit. The sphagnum moss forms an inviting thick, soft, green carpet on the ground. But, stepping on it, the explorer sinks deep into the bog—and gets his feet wet. The sphagnum moss holds sixteen times its own weight in water, being more absorbent than cotton. It was used for surgical dressings in World War I.

There are forty-two miles of good trails in the park. Among the trails are the Lind Saddle Trail, beginning at Douglas Lodge, circling through the forests for thirteen miles and passing within sight of twenty-eight lakes and ponds before returning to the starting point. The Bohall Trail begins at the west arm of Lake Itasca and continues for two and one-fourth miles through some beautiful virgin Norway pine stands to Bohall Lake and the park drive.

Much of the 32,000 acre area of the park is not even pierced by trails, thus leaving Itasca an interesting although not untouched wilderness. For students of Nature, Itasca is a paradise. University of Minnesota educators realized this when they established the Forestry School and Biological Station on the shore of Lake Itasca. All forestry students are required to spend a summer of practical forestry field work in Itasca Park. The biological station draws students interested in the natural sciences, and research men from many states.

Indian mounds have been discovered at several places in Itasca State Park. These mounds were constructed by ancient Indian peoples, ancestors of the present Sioux, Iowa, Assiniboine and other bands. The Itasca Lake village site and mounds, a quarter of a mile north of Lake Itasca, were of Dakota Indian origin.

Many hundreds of arrowpoints, stone hammers, spearheads, blades, flint knives, cores, pot shards and other objects have been gathered from the Itasca Lake village site, which was originally discovered by Jacob V. Brower when he was commissioner of the area. These artifacts have been placed in the archaeologic exhibit in the State Capitol Building at St. Paul.

Itasca State Park lures the vacationist. For lodging in the park, one may choose between Douglas Lodge, Minnesota's own rustic resort, the modern log cabins, or the improved camp grounds on the hill overlooking the lake, where the visitor may pitch his own tent. The Division of the State Parks of the Minnesota Conservation Department has made these accommodations possible.

One who has seen the tall pines silhouetted against the sunset sky, heard the uncanny cry of the loon at night, watched the beaver gnawing at an aspen tree, smelled the fragrance of the balsam fir, looked into a mallard duck's nest on a floating bog, and felt the pull of a northern pike on his tight line will never forget beautiful Itasca where the Mississippi River begins—where "Ol' Man River" starts to the sea.

Summer Poetry

By FELICE DE HORVATH

Summer poetry should be
Light as fairy melody.

Languid as the afternoon,
Luminous as August noon.

Fragrant as the rose at dawn
When the sun-sipped dew's withdrawn.

Tinkling fountains should be heard
And the deep-woods note of bird.

Soft and gentle words that speak
Wisdom of the mountain peak—

Sweet yet searching words that bring
Cool clear wisdom from the Spring—

This, in part, it seems to me
Summer poetry should be.

Rocky Mountain Solo

By GEORGE V. CAESAR

Self-portrait of the author displaying a sixteen-inch trout from lower Gorge Lake, Rocky Mountain National Park.

"As a habit, going alone is to be deprecated; but sparingly indulged in it is a great luxury."
John Tyndall, 1861

MOUNTAIN climbing "fever" is like malaria: one never quite is rid of it. When the genial director of the Corn Industries Research Foundation announced that the annual session of the Starch Round Table—an internationally known conference of starch chemists—would be held at Estes Park, Colorado, in the very shadow of the Great Divide, something told me that I was likely to have another attack. And with the receipt of Rocky Mountain National Park literature I was sure of it. I was 55. I had not climbed for many years. But I knew that when I looked at real mountains again I would have to get up among them, and off the beaten track, too, with or without a companion—most likely without. I always had had trouble getting anyone to tackle the sort of trips I sought, and the Round Table group, although eminent scientists, were unlikely to share Tyndall's peculiar views. And so I laid my plans for a solo adventure in small faith that I could lure anyone, or find him adequately equipped if I should.

Time had had sad effects on my climbing equipment. My old ice-axe had become my wife's favorite gardening tool, and looked it. I took it to a nonplussed blacksmith with explicit instructions, and he salvaged it into some resemblance of its former dignity. The Norwegian Army packsack was still in good shape after twenty years. An old pair of ski boots, shod with wing calks, would serve for climbing footwear, and I finally managed to gather a light pack, for the Rockies are high and my legs and heart are old. The outfit hefted thirty pounds, and included a movie camera, binoculars, and fly rod. I had a light sleeping bag but no tent, for I bet on three days of good weather.

The Round Table sessions were, as always, informal. In the off-hours I managed to get in some good training on fantastically shaped granite knobs lifting above the pine forests. The rugged backbone of the continent towered beyond these pimples, culminating in the massive half-dome of Long's Peak. It looked fascinating, but trails led to it and up it, and I longed to be off all trails. I wanted to go where few went, yet in the brief time alloted. The region of the Gorge Lakes, a glacier-cut canyon high upon the eastern flanks of the Front Range, seemed to fill the bill. I could make the lakes from the celebrated Trail Ridge Road above Milner Pass, via a Grand Lake bus, which would put me off at the Gore Range parking area.

On Thursday, September 5, the conference dissolved. The scientists faced the East and a weekend in Chicago prior to the opening of the American Chemical Society convention. As I expected, no one could or would go with me. A few, I thought, did look a little envious, but the majority suspected I was more or less daft, and said so. Possibly they thought also that I was a sanguine liar. At all events, they departed and I was left "all, all alone", and, to tell the truth, just a little shaken in my high resolve. However, the Park Ranger gave me a fire permit, and I gave him my itinerary. He looked me over quizzically but said nothing, except to advise me to report my return.

Friday morning, I really would not have been too chagrined if it had been raining. But it was a beautiful morning, so I caught the bus at nine o'clock, heaved in my pack, and relaxed on the glorious ride to the top of the mountains.

At around 12,000 feet I disembarked at the point where the road turns sharply northeast in a long loop to descend southwest to Milner Pass, 10,759 feet. Cars stop here to enjoy one of the most magnificent views in the Rockies. A long, open, grass slope ran down to a flat, pond-studded barren on the headwall of Forest Canyon. Beyond rose the Great Divide. I retrieved my pack; a young war veteran driver heaved it upon my shoulders and tied on the fly-rod case. Then a warm handshake, cheery goodbyes from the

tourists, and, shortly before noon, I was on my own again in the mountains.

The wind fortunately was light, but at 12,000 feet it had a cutting edge and I was thankful for my son's field jacket. About 500 feet of easy, downhill walking took me to the flat barrens above and east of Milner Pass, where I turned south, contouring as closely as practicable the slopes of the Front Range. I was soon in difficulties in breast-high snowbrush and wet boggy ground, and feeling the effects of the altitude.

On a map, contouring a valley is easy. One can sketch a route that varies less than one hundred feet. In practice, a strict adherence to the route may require the agility of a mountain sheep combined with the brush-smashing power of a bear, and involve such little details as fifty-foot cliffs, densely matted timberline thickets, and man-killing snowbrush. I was forced interminably into detours, nosing out a practicable route. One either has a gift for this sort of travel, or one has not. It is an animal-like intuitiveness that experience in wilderness walking slowly develops.

About four o'clock the Gorge Lakes should have been only a mile away, according to the map, on the south side of a high, bare ridge tapering into Forest Canyon on the left. A mile is not far, but at that altitude, and the way my legs felt, it seemed like ten.

I had forgotten how good it feels to shed a pack, to be rid of the dragging weight that, little by little, grows more insistent in its demands on physical and mental reserves. There are few keener joys than this sense of disembodied lightness.

Wood and water were abundant. A hole dug with the ice-axe against a large rock made a safe place for an "Injun fire". While the tea water was simmering, I recalled a small flask of conference cheer and poured myself a mountain highball, gingerly measured to a shriveled stomach and the altitude. I toasted my dear father who taught me the out-of doors; and tea, bread, and a can of beans were re lished with gusto and thankfulness. The peak through the branches turned crimson, then gray long fingers of cloud poked up Forest Canyon; th firelight brightened, the air chilled. I smoked a fina pipe, then squirmed into the light Army sleepin bag, cursing the roots too light-heartedly ignored i choosing my bed.

The farflung war has undoubtedly produced wealth of remarkable outdoor equipment, but tha bag certainly was not a part of it. By midnight I ha radiated into space all of the heat I could spare Morale was at low ebb as I stumbled around, groping for wood and warmth. I dragged my apology for sleeping bag close to the fire and catnapped on rock and roots until dawn and a pint of tea restored sanguine mood. Wild rice, soaked overnight, briefly boiled, and sugared, made a simple but tasty an sustaining breakfast. It is an excellent mountain ra tion, first suggested by my wife, who knows nothing about mountains, and has no desire to learn.

I was off again, about seven-thirty (How long i always takes to get started, in the mountains!) and grappling with the steep grass and broken rock slopes of the ridge. I was thankful I had had the mature good sense not to tackle it the afternoon be fore. What a help and safeguard the ice-axe was! A veritable third leg, its broad head propped me as I draped over it, breathless, heart hammering, look ing down on the spearlike treetops far below. In work of this sort a good Swiss axe is indispensable, a climb ing tool evolved by generations of mountain climbers and wellnigh perfect.

The ridge crest was broad and flat. About 500 feet below, on a shelf of the northern side of as savage a glacier gorge as I ever looked upon, sparkled sapphire lake, the northeasternmost of a chain o

PHOTOGRAPH BY W. BECHTEL

The village of Estes Park with Long's Peak in the background. It was from this point that the author set forth on his solo in the wild back country of Rocky Mountain National Park, Colorado.

PHOTOGRAPH BY W. BECHTEL

Bear Lake in Rocky Mountain National Park, wild and beautiful and a spot to lure the more hardy visitor who enjoys, as did the author, seeking places where he can be alone in his enjoyment of the outdoors.

four, strung on granite steps scoured by the ice of long ago. Yet it was probably not so long, geologically. When Columbus discovered America this cirque may have been choked with ice. Across the gorge towered tremendous granite precipices, and the northern walls, not far to my right, looked almost as sheer. I had struck the best spot to get down to the lakes.

Nevertheless it was with a rather uncomfortable sensation of climbing into a trap that I began to descend. What if the good weather broke and clouds shut down? My route was too intricate to retrace blind, even with a compass. The only practicable solution would be to work eastward downhill into the tangled depths of Forest Canyon along the line of the creek draining the lakes, cross the Thompson River, and climb, as best one could, straight up the mountainside to intersect somewhere the Trail Ridge Road. Such was my emergency plan. With continuance of good weather I proposed either to scale the headwall of the cirque, or the northern wall at some point farther southwest, and so reach the crest of the Great Divide; thence southeast along it to Flattop Mountain, not far from Long's Peak, and descend by the trail to Bear Lake and tourist haunts. This was the plan I left with the Park Ranger.

The descent was easy, if in spots involved, and soon I was teetering along the rocky shore of the lake, thinking of trout frying in the pan and a good camp. What I stumbled upon was almost too good to be true: a huge bed of withered, scented fir branches under a thick timberline canopy, a rock fireplace in front, plenty of cut wood, a cache of canned goods, even two large frying pans. The sunlight sparkled on the lake; the high thin air felt like nothing imaginable at sea level; the scenery was awesome and beloved. I dumped my pack and rigged my rod with feelings I shall not even attempt to describe in words.

The lake shore resembled nothing so much as a seawall of broken rock. Without the sure support of my staff it was altogether too easy a place to break a leg or an ankle. Rod in hand I tottered uneasily over the slabs to find a steady spot from which to cast. I was retrieving the wet fly on my third cast when a silvery torpedo hurtled from the blue depths. I struck and felt that solid weight and surge of a big one. He must have taken about twenty yards before I stopped him. What a battle! It was fifteen minutes before I could work him close enough to see that he was foul-hooked near the tail. Luckily I had a long-handled net or it would have been the old yarn. The Yellowstone trout, a variety of cutthroat, measured sixteen inches. I set up my movie camera on a rock and photographed us. Then I fried him and ate him, pronto. Gluttony cost me dearly. Wind began to pour down over the Divide in fierce, vertical gusts, in which it was next to impossible to cast, continuing all afternoon and increasing at dusk. There were lulls, of course, and with sufficient determination I might have fished. But the walking without a staff was so dangerous, and the work so tough at that altitude, that somehow I lacked the mental drive for it. I needed sleep and rest. And so I passed the afternoon in idleness and languor, which I now regret but which meant little at the time. Oxygen lack was sapping will power.

Long looks at the upper gorge through my binoculars banished all hope of going out that way. The biggest lake of the four was about 500 feet below and to the southward, the other two well above it on polished granite steps in a truly Dorêan setting. It was perfectly practicable climbing for an experienced mountaineer, but it certainly was no place for a lone one. Age is "sicklied o'er with the pale cast of thought."

(Continued on page 330)

June Is the Month for Gardens

By ANDREW S. WING

Photographs from J. Horace McFarland

WHEN June comes, summer is just around the corner. James Whitcomb Riley, Hoosier poet of the people, summed it up well in his famous "Knee Deep in June" poem. And a current Broadway hit gives it another apt twist in the song "June's a Bustin' Out All Over!" June has the ripeness of late spring and the fresh maturity of early summer. There is no other month quite like it.

June is the month of roses, it is said, although there are a number of roses that display their claims to advantage earlier, or later on. But the first roses, and particularly the climbers and the hardy early sorts, are always just a little breathtaking in their beauty. And now there are many of them—new and old—nearly all of them beautiful in their way. And some of the oldest sorts, the "cabbage," moss, and memory roses of our grandmothers, are being featured by leading rose growers because of their inherent beauty, quality and ruggedness.

"A rose is a rose is a rose," wrote the late Gertrude Stein, but not so to the rose fanciers, to whom there is all the difference in the world between the various types and the hundreds of fine varieties. A visit to one of the good rose collections in a botanical garden, public park, in one of the private collections, or a good nursery will be a revelation to one who is familiar only with the commoner sorts. I urge that every lover of beauty make such a visit, whether he intends to grow roses or just wants to revel in their beauty and fragrance.

June is the month for iris, too—one of the few flowers of which I never tire. There are beautiful irises for every season and every purpose. I almost said "for every purse," but that would not be quite fair to this loveliest of all our hardy perennials. New creations of the hybridist are often dear, but after they have been offered to the public for a few years, rapid propagation puts them into the catalog at reasonable prices.

For those who may have forgotten, or overlooked, the ramifications of this beautiful flower family, let me point out that the dwarf early irises start blooming in April, and that there is not a month in the growing season when one or more of the iris varieties cannot be counted on to flower, although the fall bloomers are not too steady in their habits. But after the early, midseason, and the late bearded irises have run through their glowing palette of shades and colors, we have just begun the iris season. For then come those large but delicate, and in many ways the loveliest, of all the members of this tribe, *Iris kaempferi*, or, as we commonly call them, Japanese irises. Exquisite in both form and shades, these masterpieces of the Orient are quite easy to grow, although they do appreciate a moist spot that is well supplied with organic matter. The Siberian irises, with their upright, orchid-like petals, are handsome, too, and come in many shades. A massed border of these in bright blue, purple, white or yellow is a welcome sight.

Why is it, I wonder, that so many of our loveliest flowers and handsomest plants either originate in or bear the names of nations with which we have been at war or at least have been close to swords' points in recent years? And is it not rather a tribute to our increasing tolerance that we no longer feel obligated to change the name of a plant just because nations have a falling out? At least we did not find it necessary to resort to calling good, plain, German-American dishes such names as "Liberty cabbage" and "Liberty sausage" during the recent world disaster. And

here was one Japanese restaurant in New York, wned and staffed by loyal Japanese-Americans, that ontinued to operate successfully right through the war!

But plant names are deceptive and frequently have o relation whatsoever to the countries where they riginated. The Irish potato, a native of South Amerca, is the classical example of misnaming. Likewise many of our native plants that are common to our wn Eastern states are designated officially as *canaensis*, simply because they were first discovered in he Canadian north woods. But to the true plant over, names are not too important. If one were easily prejudiced by imposing names, such beautiful plants as the California poppy, *Eschecholtzia californica*, and the dwarf Japanese yew, *Taxus cuspidata nana*, variety *brevifolia*, would not enjoy the popularity that they have and so rightfully deserve.

However, let us return to June. Nights are warm, usually rain is plentiful, and everything grows as the weeds grow. New growth appears on shrubs and trees. The lawn needs cutting every week, but, incidentally, should not be cut too short, for to do so will encourage crab grass, which abhors shade. If dandelions, buckhorn plantain, and other weeds infest your lawn, spray with a solution of 2,4-D, which will kill weeds but does not injure grasses, if used carefully and according to directions.

Spring-flowering shrubs should be pruned now in the North, unless they bear fruit or berries that you wish to save for fall display and to attract the birds. Cut back the older stems to the base with most shrubs, thinning carefully, but do not give formal shapes to such graceful shrubs as the forsythia. It is their pendulous character that makes them interesting. Hedges will need frequent pruning; to wait too long makes the job harder to do. It is time now to plant the last of the summer bulbs, such as gladiolas and dahlias, if this has not already been done.

Fertilize liberally all new plantings and growing plants in vegetable garden and the flower border, being careful not to dust chemical fertilizers on leaves, for to do so will often cause burning or discoloration. A light topdressing of a complete plant food on the lawn is often advisable, but it is better to supply it just before a rain, or else to wash it in with a hose immediately afterwards. When plants are growing rapidly they need a rich diet of available plant food. The closer to the roots the plant food is applied, without actually touching them, the better. That is why, in the vegetable garden, it is now recommended that fertilizer be spread in a row parallel to the plants, or, in the case of hill crops, in a ring around them. In short, fertilize the plants instead of the ground, as the old practice was.

Seedings should now be made for later crops of lettuce, beans, and other crops. Plantings of sweet corn may be safely made up to July 1 in all but the colder regions. Annuals may still be planted from seed to fill in the gaps in the border caused by the fading of the early-blooming perennials and bulbs. Tulips and narcissus bulbs may be lifted and divided, if crowded, as soon as the foliage has turned brown. Or, if you intend not to disturb them, simply remove the foliage as it matures, for by then the plant food for next year's bloom will have been stored up in the bulb, and it will be taking a siesta in the soil.

Some like large flowers, but there are many gardeners, including Andy Wing, author of this article, who prefer more flowers and masses of color in the garden.

A lovely lawn is a joy indeed but it means care and thought. Weeds can now be kept out by use of weed killers, and crab grass discouraged by not cutting too closely with the mower.

Stakes should be set now for all plants that need support, including tomatoes, pole beans, dahlias, and tall chrysanthemums. Vines will need attention, too, especially such rapid growers as the morning glory. And what can be more charming than a Heavenly Blue morning glory twining over a doorway, a picket fence, a garage, or other outbuilding! Attention will also need to be paid to the rambler roses, wisteria and other perennial climbers to see that they receive proper support and sensible guidance.

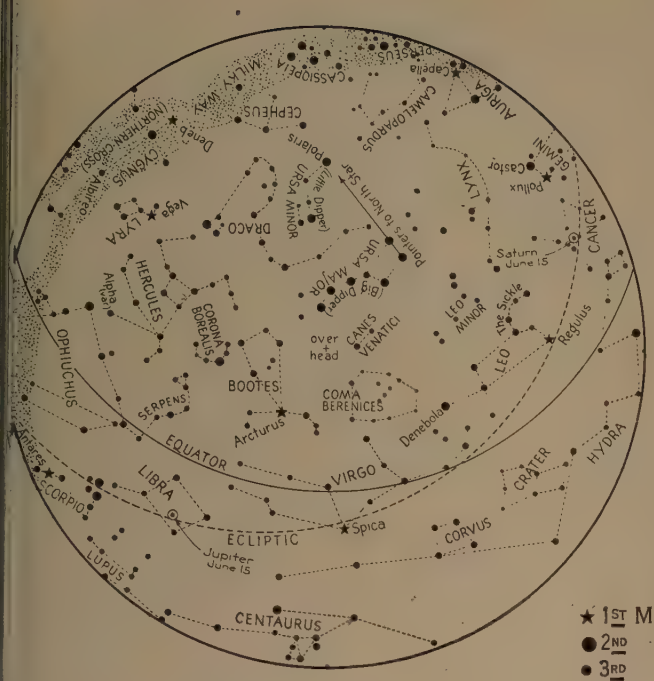
Yes, June in the garden means plenty of activity for the gardener, but the heavy work of planting is over, and now it is more of a battle of wits than of muscle against the forces of Nature, which seem intent on rushing everything to maturity before the short days of autumn approach. More and more gardeners are learning how to use labor-saving ways and devices, such as the wheel hoe in the kitchen garden, weed killers and flame throwers in driveways and on walks and paths, or where poison ivy grows from stone walls. For this purpose a stronger chemical than 2,4-D should be used, Ammate for instance. The new electrical or mechanical hedge trimmers are marvelous although I have never owned one. And the little wheelbarrow, made of magnesium and weighing only twelve pounds, is a great boon for the "weaker" sex, or, for that matter, tired business men with "weak backs" and sagging waist lines.

The matter of keeping ahead of bugs and blights can be made a game, but it must be played consistently and almost constantly in June and before these pests and plant diseases get a foothold. Spraying and dusting is no particular chore in the home garden if you have the proper equipment, and the correct insecticides and fungicides to use. But spray the moment the bugs appear, or even before, if you want to control them properly. Waiting until the leaves of your plants are crawling with insects, or sick with blight or mildew, is an inefficient and wasteful way of handling these problems. Prompt action is not only better but easier in the end.

Surely but slowly we are developing strains and varieties of vegetables and other plants that are disease-resistant. So far as I know, no entirely insect-resistant plant has as yet been created by man. That may, however, come in time. Meanwhile we shall have to rely on good cultural practices and chemical poisons or repellants to keep the insect hordes under control or beyond our borders. Those whose enthusiasm for organic gardening carries them to the extent of claiming that the fertilization of the soil with organic manures alone will keep both insects and diseases under control, or eliminate them entirely, do not, as yet, have sufficient scientific evidence to clinch their positive pronouncements. No one familiar with soils and organic processes would be so foolhardy as to deny the value of humus, or composts, earthworms, and all forms of legitimate soil-conservation practices. But certainly we are not quite ready to discard the use of chemical fertilizers, including lime, or the spray gun and dust machine. Good plant spray and dust guides may be obtained from county agents, agricultural college extension services, and from reliable insecticide and fungicide houses. These should be carefully studied and followed.

As June fades languidly away and the more torrid month of July follows, crops from the garden will come on with greater regularity and abundance. Zinnias, marigolds, petunias and other annual flowers will supplant the perennials and biennials, such as foxglove, Canterbury bells, and columbine. Hollyhocks will bob up with their handsome heads towering over the garden wall. The late climbing roses and other midsummer bloomers will arrive as dog days usher in real summer weather. Tree foliage is now fully matured and rather less interesting, and we must look to the garden for intriguing contrasts.

Midsummer budding and pruning now comes into the picture. If you want (Continued on page 329)



9 P.M., June 1; 8 P.M., June 15.

★ 1ST MAGNITUDE
● 2ND "
● 3RD "
· 4TH "
· 5TH "

9 P.M., July 1; 8 P.M., July 15.

To use these maps hold them before you in a vertical position and turn until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

June and July Skies

By ISABEL M. LEWIS

A NOTICEABLE feature of the early evening skies in June is the disappearance from the western sky of that branch of the Milky Way that was so conspicuous in winter and early spring. It is not until late June, or early in July, that one sees, running from northeast to southeast along the eastern horizon, the continuation of the Milky Way from Cassiopeia through Cepheus to Cygnus, and its separation in that constellation into two branches, one passing through Aquila and Sagittarius, and the other through the huge constellation of Ophiuchus to Scorpio. It is from early May to late June that both branches of the Milky Way are absent from the evening sky.

Fewer brilliant stars are visible in the evening skies of the northern hemisphere in summer than in winter. Arcturus in Bootes, Spica in Virgo, and the second magnitude star Denebola, in the tail of Leo, lie at the vertices of a huge equilateral triangle that appears in the eastern sky in early spring. By the end of June, this is in the western sky, the Sickle in Leo, and its first magnitude star, Regulus, approaching the western horizon. Scorpio, with its red, first magnitude star Antares, is now visible in the south and is one of the most beautiful of the southern constellations, its long curved tail of brilliant stars extending almost to the southern horizon. According to an old legend Orion was so afraid of the Scorpion's sting that he disappeared in the west as the Scorpion came into view in the east.

Vega, the brilliant white star in Lyra, which is equal in brightness to the yellow giant star Capella—on or below the horizon—and orange-hued Arcturus will both remain visible throughout the summer. Huge Hercules and Ophiuchus, which cover a great area in the evening sky in summer, contain no stars brighter than second magnitude. Cygnus, The Swan, contains the well-known Northern Cross, with Deneb, a star of first magnitude at the top of the upright, and the yellow and gold double star, Albireo, considered one of the most beautiful doubles in the heavens, at its foot. South of Cygnus, in Aquila, The Eagle, is Altair, another star of first magnitude. North and east of Aquila is that small, diamond-shaped configuration of faint stars known as Delphinus, The Dolphin, or also as Job's Coffin.

Sagittarius, The Archer, will appear on the southeastern horizon late in July, and is easily identified by the small inverted dipper outlined by some of its brightest stars. The far northern constellation of Draco, The Dragon, lies across the meridian above the pole at this time of year, (Continued on page 332)

The School Page

By E. LAURENCE PALMER

Professor of Nature and Science Education, Cornell University, and Director of Nature Education, The American Nature Association

ALL GALLS ARE DIVIDED

One of the thing I remember from first year high school was Caesar's commentary on the division of all Gaul into three parts. It is only natural, then, when I write about something that sounds like Gaul that I think of the divisions into which it may fall. While the Gauls have tried desperately, again and again, to inherit the earth, the galls have, to no small degree, succeeded. They have done so by minding their own business, and by getting along with their associates, even though now and then monopolizing the situation in their own interests.

The galls of which I write have been treated in considerable detail in the special insert in this issue of *Nature Magazine*, and what was written there need not be repeated here. Instead, it may be well here to present a viewpoint of galls useful in the school room and for children of different school ages.

For the younger children, it may be intriguing to recognize the happy situation a gall-causing organism creates for itself by the modification of its host. If we study any gall from the angle of its causal organism, we must recognize the perfection that is usually attained. To most organisms, successful existence depends primarily on suitable and abundant food and satisfactory shelter. Usually, gall organisms attain these necessities by merely needling the host and stimulating it to expand and produce what is needed. Let the children examine any gall they find to discover whether these essentials are present. For example, let the children note how perfectly the outside of an oak gall is waterproofed; how admirably the center residential area is insulated from the outside by suspending threads, how compact is the inner sanctum in which the causal organism lives in isolation but in comfort. One might philosophize and wish that, somehow, some of our world's prime complainers could solve their own difficulties with equal ease.

Besides recognizing the ingenious ways in which gall organisms master their essential needs of food and shelter, it is worth our while to see how they vary at different stages in their life history, and how they get along with organisms other than those they select as hosts. As is shown in the insert, a few use different hosts at different stages in their development, and a few develop characteristic galls at different ages. Some apparently bury themselves, rather completely divorced from the outside world, while plenty of others maintain an open channel through which they or their offspring may leave the haven they have created for themselves. Divide the galls you find—on the basis of what you can see—into those that do maintain an opening to the outside world and those that do not; then divide them into those that show by some escape opening that the host plant has been deserted by the causal organisms. When you start examining these escape routes you may be surprised at what you find. Some break through the covering tissue rather blindly, while others cut precise exits in the material they helped create. A few, like some of the globe galls on goldenrod, go to considerable pains to have this escape suitable to their needs. Since the adult may be a delicate insect, incapable of making its way through substantial tissue, the larva may cut the entrance before it pupates and leave the merest remnant of tissue through which it may easily pass.

Personally, I think that the two most remarkable things about galls are that while they are so different, nevertheless those made by any kind of organism have characters that enable us, with comparatively little definite training, to recognize the maker. The other thing that holds my interest is the great variety of organisms that have used the gall making technique, directly or indirectly, to get what they may need. A survey of these organisms would include acquaintance with bacteria, and with a few of the higher plants, like the mistletoe, although some do not consider the swellings these produce as being really galls. It would include, in the animal kingdom, worms, spiders, flies, beetles, moths, wasps and bugs of many sorts. What more can one want as a basis for getting acquaintance with groups of living organisms! Of course, any such study must include reasonable acquaintance with the host organisms, and an ability to identify them with some certainty. Here, too, we expand our contacts with living things and explore organisms living in many types of environment.

Man flatters himself that he has, to a considerable extent, mastered his environment. One can question, really, whether he has done this to the extent the gall organisms have. Man has an insatiable appetite to dominate everything in his environment, even his own kind. Possibly this might be said equally well of the gall-forming organisms, but it is certain that, year in and year out, the average number of galls of a kind found in a patch of goldenrod, or on the leaves of the poplar in your yard, may run about the same. Rarely is the poplar destroyed, or the goldenrods so infested with galls that they do not keep on growing and provide suitable sites for the development of future generations of galls. Man, on the other hand, may well exhaust the resources at hand and then seek new territory, in the process destroying other men who may not be able to resist encroachment. Have we really mastered ourselves and our environment, or are we flying into a tailspin such as ended earlier civilizations?

Of course, the economic-minded man will look to the subject of his study for possible materials of remunerative value. Such will find in the galls a stimulating field of study, ranging from the roles galls have played in the general economy of an area to unexplored fields that may offer promise. In America we have come to look to the machine to relieve us of the burden Old World civilization still saddles on human beings. Because of this, we often still remain dependent on foreign sources of supply for many things that call for some skilled human labor related to the use of galls. It is not impossible to assume that eventually we may be able to divorce ourselves from foreign sources of supply by perfection of gall management under our normal practices of using machines. In the last few years, we have found industrial uses for the manufacture of what we consider as essential medicines from fungi that were considered of negative importance a few years ago. Who knows but some day we may be raising the tannins and other chemical compounds produced by galls on a scale on which we now produce penicillin. It is ridiculous to assume that such varied biologic units as are represented by the galls cannot yield values that have as yet been wholly undiscovered. While these discoveries may eventually challenge the efforts of economists, chemists and physicists, there is little doubt but that the initial information will be gleaned by painstaking biologists seeking the secrets of Nature for no other reason than to satisfy their intellectual curiosity. No teacher should ignore the possibility that encouraging a child in the grades to know more about local galls may, some day, yield results of great importance. The tragic fact is that few teachers recognize the importance of encouraging and developing in their students the habit of satisfying intellectual curiosity. Too many apparently feel that the way to success in the field of science lies in arbitrarily disciplining the student according to the recommendations of the school's workbook.

No teacher can be expected to master all the opportunities that galls present in any locality at any time of the year, but all teachers should encourage students to explore interesting subjects.

Encyclopediae

The Illustrated Encyclopedia of American Birds. By Leon Augustus Hausman. New York. 1947. Garden City Publishing Company. 541 pages. 16 color plates. Black and white illustration by Jacob Bates Abbott. $2.49.

The Illustrated Encyclopedia of American Wild Flowers. By Ethel Hinckley Hausman. New York. 1947. Garden City Publishing Company. 534 pages. 16 color plates. Illustrations by Tabea Hofmann and the author. $2.49.

Because they are a sort of family affair, come from the same publisher and are closely similar in physical presentation, these two books seem to demand review together. Each is a relatively satisfactory guide to the fields they seek to cover, although too large for convenient field use or pocket transportation. In the case of both books the black and white illustrations are rather rudimentary, but will serve as an aid to identification of the distinctive species, at least. Most reasonably priced, these books should have their particular appeal to many bird and wild flower students. It should be noted, however, that the birds are arranged by groups and species alphabetically, and the plants alphabetically by botanical families, which is no help to the amateur who does not know for what he is looking.

R. W. W.

Societies to Meet

One after the other, the American Society of Mammalogists and the American Society of Ichthyologists and Herpetologists will meet at the Higgins Lake Training School of the Michigan Department of Conservation from August 24 to 30. The mammalogists will meet first, from August 24 to 27, and the ichthyologists and herpetologists will take over facilities on the 27th. The Higgins Lake School provides quarters for about 90 persons, others being accommodated at Roscommon, Michigan. Further details may be obtained from William H. Burt for the mammalogists, and Norman Hartweg for the ichthyologists and herpetologists, addressing either or both at the Museum of Zoology, University of Michigan, Ann Arbor, Michigan.

Audubon Nature Center

Five sessions of five days each for leaders of youth organizations, and for conservation chairmen of woman's clubs and garden clubs, will be held at the Audubon Nature Center, Greenwich, Connecticut, starting June 16. Two conservation workshops of two weeks each will be held in August for teachers and Nature and conservation leaders. Full information may be obtained from the Center.

Darling's Cartoons

Our Great Out-of-doors is the title given to portfolio of conservation cartoons from the great cartooning pen of Jay N. "Ding" Darling. There are thirty of these picture messages reproduced in a size of six by seven and one-half inches. Being separate, they are excellent for posting where they will do the most good. This fine portfolio is brought out by the Iowa Division, Izaak Walton League of America, 732 Fenelon Place, Dubuque, Iowa, at one dollar—and well worth it.

Science Writing Awards

Two awards of one thousand dollars each for outstanding science writing in 1947 are announced by the American Association for the Advancement of Science. These are the George Westinghouse Science Writing Awards, one for a newspaper writer and the other for a magazine writer. The latter award is new this year. Dr. Willard L. Valentine, editor of *Science* and chairman of the awards committee, says: "Each story submitted will be judged on the basis of clarity of interpretation, scientific accuracy, initiative shown in selection of material, and the extent to which it promotes a sounder understanding of science among readers." There is no indication as to whether the preference is for articles in the physical science field only, or whether the biological sciences come within the scope of the awards.

Forests and the South

The 4 Forests and the Future of the South. By I. F. Eldredge. Washington, D. C. 1947. The Charles Lathrop Pack Forestry Foundation. 65 pages. $1.00.

Four quite well-defined forest regions exist in the Deep South—the naval stores belt, the up-country pine and hardwood forests of the interior, the Delta hardwoods and the timbered country west of the Mississippi. Separately and together they have a great bearing on the future of the South. What this bearing is Mr. Eldredge has set forth in concise, popular and interesting terms in this important little book. His introductory chapter draws as effective a picture of southern character, composition and manner of thought as we have anywhere read. His succeeding chapters discuss the forest resource distribution, the manner in which these forests are used, ownership of the timberland, trends in ownership, relation of the people to the resource, the place of the forester and the problem of fire. Here, however, is no deep, scientific treatise but, instead, a book that should be read by everyone who has concern for the future of the Deep South, an area that the author knows intimately through birth, education and experience,

R. W. W.

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Camera Trails

By EDNA and BILL EVANS

SOMEWHERE, in one of the innumerable bird books that we have been reading ever since we were old enough to know there were such things as bird books, is a statement to the effect that anyone can admire the dainty woodland songsters, but only a true bird lover can see beauty in the noisy, self-sufficient, and sometimes awkward feathered residents to be found along the sea shore.

If this is the case (although we are inclined to doubt it) we can qualify. To us the shore birds—raucous or no—are every bit as attractive as the woodland songsters.

Perhaps it all depends on what the bird lover is acquainted with in the way of feathered neighbors. Human eyes, accustomed to the small birds of meadow and woodland, may not see beauty, or even grace, in the black "nigger ducks" or cormorants as they perch on piers and pilings with wings outstretched, airing their feathers. Compared to a tiny wren or hummingbird, herons may seem awkward, while eyes attuned to the colors of cardinal or oriole may not at once perceive the beauty in the gray, white, and black tones favored by most sea birds.

Then, too, we will admit, without argument, that the raucous cry of the gull, the squawk of the egret, or even the piping of a sandpiper cannot compare with the song of the thrush, the mockingbird or the warbler.

Since we live in Florida we do not have the thrill of seeing the first robin of spring. Nor can we watch many migrants arrive for a season of nest building and family rearing. Some of those migrants spent the winter with us. Others passed through as tourists, en route to and from winter vacations in regions farther south.

But there are other signs of spring that we can watch for, signs revealed to us by our shore bird neighbors. As spring approaches, laughing gulls change their sober gray-and-white by donning aristocratic hoods of black. Egrets appear in lacy white plumes, and even the blue-gray feathers of the herons take on a brighter hue.

Surest spring sign of all is the arrival of the least terns, tiny shore residents that winter in areas farther south. Early in February we begin to notice an occasional lone individual, hovering over a bridge causeway or along the beach, looking the housing situation over. As February fades into March and March into April, more and more least terns appear. By May and June the tern nurseries are going full blast.

Waiting for the proper time to pull the fish line and release the "trigger." The camera is set up far enough away so that it is necessary to use field glasses to follow the tern to the nest.

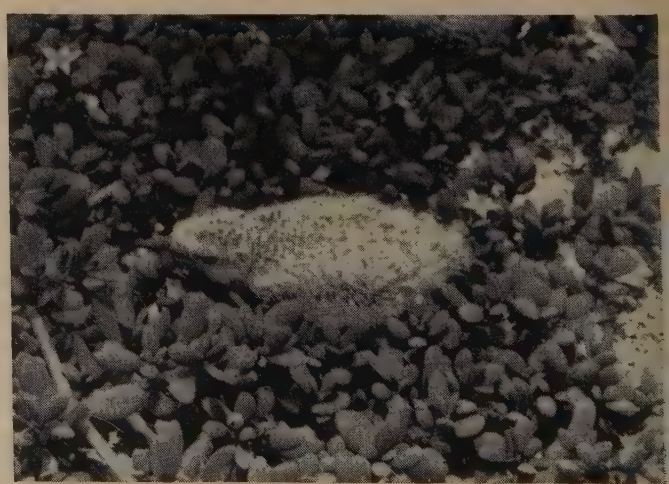
Then is when we load up the camera equipment and journey beachward, for photographing shore bird activities is an annual event that never grows stale. To us there is an unbeatable thrill in finding the first pair of sand-colored, brown-splotched eggs in a neatly scooped-out hollow on the shore. There is an even greater thrill in finding the first tiny ternling of the season.

We get so interested in those feathered neighbors of ours that we are apt to go "trigger happy" on a film-devouring scale. In our enthusiasm, every nest hollow looks different—this one has an unusual arrangement of shell fragments around it, while that one has no shell fragments at all. This one has three eggs, while that one has only two. A young tern has hatched in that one over there, while his brother's egg (or perhaps her sister's) remains unbroken. And here are twins —there are triplets.

Thus it goes, every spring. It is only when we go through our file of negatives that we are amazed at the number we find under the classifications: "least tern—nesting", "least tern—eggs", 'least tern—young". Next year we will do the same thing over again—and the next year after that.

So far as photographic techniques are concerned, beach bird colonies present certain difficulties, and are singularly free from certain others. There are no obscuring leaves and foliage; no trees to climb; no shadows to worry about. Instead, there is the vast expense of white sand, broken by occasional clumps of beach grass or assorted driftwood fragments. Then there is the water, stretching to the horizon. Overhead the sun shines, and the white sand and blue water reflect its rays blindingly.

Mrs. Tern settles down for a session of incubating. Her "nest" is the tiny hollow in the sand, with a few bits of shell scattered about. Note how well her eggs match the surrounding sand.



This half-grown tern thought it had found a snug hiding place in the low clump of shore plants, but the camera's eye soon detected him. Ternlets depend on their tan down to hide them.

Camouflaging the camera before trying for a tern-on-the-nest picture.

The camera lens must be stopped far down, and photographers must wear dark glasses.

It is great fun, tramping up and down the beach, hunting nests, following an occasional spry tern youngster into a hide-out clump of grass. It is necessary, of course, to walk with care because the nest hollows and eggs are so artfully camouflaged that a misstep might mean a tern tragedy.

Of course, our presence in the tern nesting colony is not welcome. Overhead, as we progress, the disturbed parent birds twitter shrilly. There are always one or two, more militant than the rest. Probably it is their nest we are disturbing. They will hover overhead and then swoop down at us, pulling out of their power dives just in time to zoom past our ears. The wind whistles through their feathers; spray from their wings clouds our dark glasses; we can not help but dodge, even though none of the embattled little gray-and-white parents has ever actually struck us.

As we move on—and we try never to stay too long at any nest—the excitement dies down and the valiant little warriors return to their own affairs. Their place in the air above us is taken by another indignant set of tern parents.

Least terns are not particularly wild. Nevertheless, they have had enough experience with human beings to know that it is best to move away as we approach. Thus, in order to get actual tern-on-nest pictures, we must arrange some other technique than the beach promenade that nets so many interesting nest and egg pictures.

We are not 'blind" photographers. We have never had the opportunity—or the time—to build some natural-looking structure and leave it to stand long enough for the birds to get accustomed to it. On an open-to-the-public shore, this would not be possible. Somebody would knock it down, or use it as a place from which to shoot at the birds with .22's or B-B guns. Then, too, photographing from blinds has always seemed to us to be a rather outrageous encroachment on a bird's privacy.

When we want tern-on-nest pictures, we set the camera tripod firmly in the sand and focus on one particular, likely-looking nest hollow. We use our telephoto lens, so the camera does not have to be too close, and we arrange a few stalks of sea oats or grass so its square, black outlines will not be too much at odds with the smooth white expanse of beach.

Then, when everything is ready, when the nest is in focus, the lens stopped down for the proper exposure, the tension set, the slide out and the camera top closed, we attach a fish line to the "trigger" and leave. Back in our car, parked some distance away, we wait, watching through field glasses until the tern mother returns to her nest.

She may be a little wary at first, suspicious of the strange black structure standing not too many yards away. She may advance and retreat several times, moving daintily across the sand on small, webbed feet, or flying up on gray and white wings—only to return again, each time more courageous than before.

Finally, since nothing happens to disturb her, she reaches her nest hollow, inspects her eggs, and finally settles down on them. We have learned to wait a few minutes after this, for the tern may fly up suddenly, startled by something before she is completely settled. Finally, when she is in a position that will register on our film, we gently pull our end of the fish line, trip the shutter and take her picture.

Often, we are so far away from the camera that we cannot hear the "click" as the exposure is made. Nor does the sound seem to bother the tern, for she gives no indication that she has heard it. Once or twice, not realizing the exposure has been made, we have pulled too hard on the string and dislodged the camera. Fortunately, it has fallen completely over just once, and then in such a way that the lens was not injured. But we do add this warning, for photographers who may try for similar pictures: Be sure your camera and tripod are firmly anchored and, even so, pull the string gently.

Of course, it is necessary to disturb the tern again in order to change film. But she soon returns to her nest, especially if we move quietly and not too abruptly when we disturb her.

Terns on the wing make attractive pictures, too, but we do not have space in this section to go into the techniques and difficulties of flight pictures.

(Continued on page 332)

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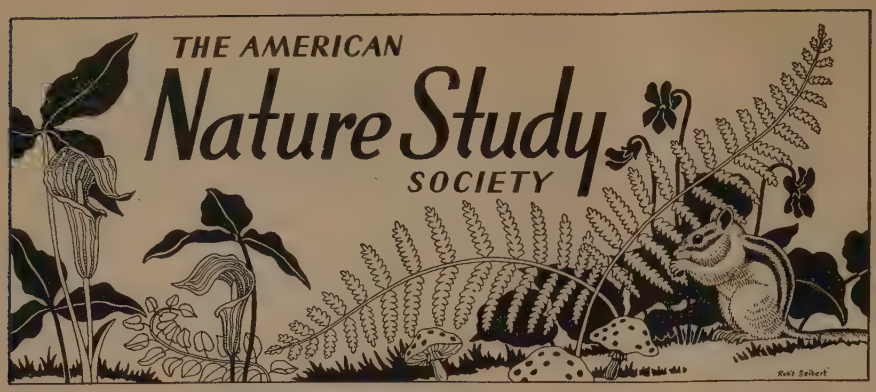

IMPROVING CAMP PROGRAMS

By ELLSWORTH JAEGER *

Since the beginning of man's existence, he has lived in the out-of-doors. It is but a short era in his history that he has lived in the artificial environment of the city. Thus, biologically, man is an outdoor animal, created to breathe fresh air, to be exposed to the sun and to eat the fruits of the earth.

But he has quickly forgotten how to live in his natural environment and how to enjoy it. In this age of apartments, electricity, and packaged food, the city dweller has little knowledge of the fundamentals of outdoor living, of firemaking, of the use of the ax and knife, of the making of outdoor beds and shelters or how to recognize edible or poisonous plants. Sunburn, ivy poison, mosquito bites, and ants in the salad dressing are the most vivid experiences of the urban dweller's venture back to Nature.

Some 25 years ago in New York City I heard Ernest Thompson Seton make a stirring plea to take our city dwellers back into the out-of-doors. A wealthy philanthropist in the audience was so convinced that he chartered a steamer and took a hundred lower Eastside boys up to his beautiful woodland estate in the Catskills. There he turned them loose into the woods and told them to have a good time. A few hours afterward he looked up the boys and found them sitting around shooting craps, playing cards. It was not enough to take people to the out-of-doors; they must also be shown how to live there and how to enjoy it.

Today at Life Camps, directed by Dr. L. B. Sharp, boys and girls from the same environment of the East side are having the time of their lives living in the open, putting up wickiups, teepees and lean-tos, cooking their meals over an open fire, building clay ovens, making themselves comfortable with the things they find in the woods, finding the fullness of life in the song of the birds, in the smell of wood smoke, in the quiet of the woodlands, and in the joy of creating things.

Unfortunately, there are other camp directors who seem blind to their environment, for they bring to camp the sports of the city playground, the craft kits designed merely to waste time, the college science laboratory, and the cinema of Hollywood and Broadway.

The woodlands hold such a wealth of materials and inspiration that the campers' entire stay at camp can be profitably absorbed in the things of camping alone, without using activities of city origin. It is only by becoming acquainted with wildlife and the things of Nature that we can become conservation-minded. When we realize that our wild plants and trees can be used for hundreds of things, we become conscious of their value. When we see the inter-relationship of insects, birds, flowers, rain, and sunlight we learn that we cannot destroy one without having it affect the others.

Just how can we relate Nature and the things of Nature with our camp program? We can go back to the Indian and his knowledge and skills; we can go to our pioneer grandmothers and grandfathers who learned much from their Indian neighbors; we can devise ideas and skills of our own that are related to the out-doors.

Each department in camp should be interrelated. The swimming instructor should know something of aquatic life so he can call the swimmers' attention to frogs, turtles, water plants and insects, suggesting that they see the nature counselor for more information. The nature counselor should be acquainted with the craft possibilities of raw materials on his nature hikes, while the crafts counselor should know what can be used in nature in the making of a hundred craft articles. And so throughout the whole camp organization the program may be geared to the out-of-doors.

Camping builds self-reliance, for knowing how to take care of one's self in the woods with a minimum of equipment builds self-confidence.

Camping skills need not be elaborate or intricate. For instance, the art of sharpening a knife or ax is a sadly neglected activity yet an important one to the camper. Knowing how to use a few pine needles or scraps of bark for tinder, how to make fuzz sticks and to split kindling to build a fire is more important as a camp craft to my mind than boondoggling or the making of airplanes from kits.

Many a profitable hour in camp may be spent in gathering milkweed, Indian hemp, nettle or the inner bark of a fallen basswood and making Indian cordage, from fish lines to lariats. Think of the fun of taking a thin twig of willow, basswood or red maple and making a whistle with which you can imitate the white-throated sparrow. Or take a piece of soft wood, split it, stretch a thin piece of birchbark across it and make a muskrat call. The making of these animal calls develops interest in the voices of nature about camp and in the creatures themselves.

The making of flint arrowheads and flint knives is a craft that costs little and it is not difficult. Children will have more fun with a log raft or catamaran which they have built themselves than with an expensive sailing craft. Let them make their own shell spoons and use them for soup in the hashhouse. It also takes skill and patience to make a broiling stick or a pot hook and they are good camp crafts. And think how handy a pack frame can be for the next overnight hike. Yet the camper must know an ash, a hickory or willow so that he can gather the proper raw material.

A fallen birch tree, with its bark intact, offers materials for a hundred projects, including an introduction to the woodlands Indian art of bark scraping. Such objects as bark spoons, cups, baskets, purses, lanterns, candle reflectors, lamp shades, hat bands, megaphones, fans, picture frames, snow glasses and numerous articles may be made from bark.

Camp furniture such as pioneer stools, trencher tables, candle floor lamps, hat and coat trees, foot stools, candle holders, chairs, benches, cupboards, cabin and stair railings, even pioneer shingles for the cabins themselves may be made by the camper from dead trees.

There is a lot of fun tracking an animal and making casts of its tracks—if the counselor knows something about tracks and trail craft.

The surest way to develop true outdoor programs is through training courses conducted by experts who know the woods and fields, who have the imagination, skill and inventiveness to make the lore of the past fit into the present, who have the power to make things interesting and simple so that the counselor may get the most out of his sessions of study. Any program of training must be one of active participation, for most people teach in the way they have been taught.

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* Mr. Jaeger is Curator of Education at the Buffalo Museum of Science and is a director of the American Nature Study Society. His recent book *Wildwood Wisdom* is a best-seller in its field. This article was presented at the annual meeting of the American Nature Study Society, in Boston, December 28, 1947.

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JUNE IS THE MONTH FOR GARDENS

(Continued from page 322)

sturdy, bushy chrysanthemums, pinch back the leaders. If you want single flowers of larger size on mums, dahlias, or almost any flower, trim off the side buds. For garden effects, the former practice is better; but if you have a greenhouse, or go in to flower show competitions, disbudding and heavy fertilization is the way to get the mammoth flowers that some people, including flower show judges, like. Personally, I prefer garden effects—more flowers and masses of color, even indoors. With zinnias, for instance, it is always a good practice to cut out the first flower that appears on the central stock, for to do so will make the plant bushier and give you earlier bloom from the side branches.

Removing flowers as soon as they fade increases the number of flowers and makes for a tidier appearance. This is not hard to do if you use large shears, or even hedge clippers. It is one of those fussy little jobs which does not take much time and that spells the difference between a good garden and just one that "also ran."

By mid-July your garden should be in such shape that you can steal away for a week or two of golf, fishing, or a loaf at the seashore. You deserve a vacation by that time. But be prepared, when you return, to find plenty of weeds and bugs and other things that will need attention. And if you have a neighbor who enjoys fresh vegetables and has not a garden, it might be a pious thought to invite him to use up your surplus while you are away. Maybe—we say with full qualification—*maybe* he will do a little weeding for you while you are away!

Science Digest

The Science Digest Reader. Chicago. 1947. The Windsor Press. 310 pages. $3.00.

Celebrating ten years of existence, the well-edited *Science Digest* has collected between covers outstanding science articles that it has published during that decade. Because the articles chosen for digesting each month are so well selected, it was no mean task, we judge, to pick those for inclusion in the book. The final choices, however, appear excellent and result in a volume that is enjoyable to pick up when you have a few minutes to read a brief feature.

Russian-English Dictionary

Russian-English Technical and Chemical Dictionary. By Ludmilla Ignatiov Callaham. New York. 1947. John Wiley and Sons. 794 pages. $10.00.

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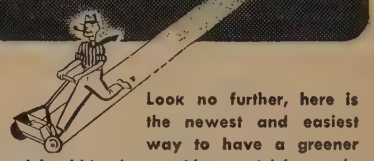

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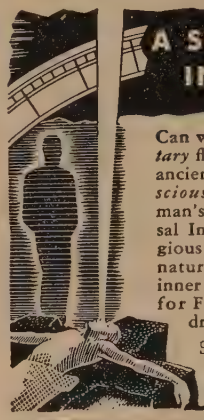

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LOOK FOR THE LEAF ON THE PACKAGE

MEETING THE WEATHER HALFWAY

(Continued from page 299)

The plane flies high and he samples pressure, wind velocity and humidity. The plane flies low and he does the same. Some parts of the flight are made by instruments alone, and at other times the crew can see the angry sky and the sullen, mountainous waves. Often the plane comes home covered by a thick salt crust from the windblown spray.

Observations and reports made during such intimate associations with hurricanes have added much to the information already available on the great tropical storms. Weathermen have become so wise in the ways of hurricanes that not one of the great tropical disturbances has arrived in recent years without ample warning being given, many hours ahead of its coming.

Recently, radar has been used to further augment the reports of the hurricane patrol. By means of "raobs," weathermen can detect wind currents high above the cloud mass of the storm. These high-up winds have an important effect on the path the storm will follow. Weathermen know ahead of time when a storm is due to change its course because high aloft radar finds winds that cause the change.

Still another method of meeting the weather half way is now in the experimental stage. This consists of robot observers, placed on islands off our coasts in locations where it would not be convenient to establish human-manned stations. If the plan is successful, the robot weathermen are to send out reports at specified intervals, and will serve as another proxy method of gathering weather information.

Weather forecasting has come a long way since the time, not so many centuries ago, when the chief magician slit open a rooster or a ram, studied its internal arrangements and then announced impressively, "It will be a clear day tomorrow."

There is no guess work involved in modern weather forecasts. The meteorologist knows what is coming for he has already met the weather half way.

ROCKY MOUNTAIN SOLO

(Continued from page 319)

Supper was over and I was squatting by the fire in absent-minded contemplation, listening to it roar like a blowtorch as the gusts fanned it into showers of brightening sparks. Suddenly I thought I heard voices. I was startled, thinking I had been too long alone, when two figures, bent under heavy packs, came slowly into view around the east end of the lake. They proved to be two nice youngsters, ex-service men, one a native and the other from Texas. They had come in over my route, and it was amusing and not a little flattering to see their astonishment at finding a man old enough to be their father. Of course I insisted that they camp with me, and it was good to have them. I had been alone long enough. They were architectural students, planning to spend several days here sketching. As for myself, I would have to pull out on the morrow, Sunday, having a reservation from Denver on Tuesday. When they dumped their packs they were tired boys. But youth has marvelous recuperative powers, and soon they were bustling about, chopping wood, frying a steak, and spreading their sleeping bags under the alpine firs.

This was a much more restful night. As long as the fire lasted it threw some heat into my shelter, and the bed of boughs, quite unlawful in a national park and for which—I hasten to add—I was not responsible, insulated me somewhat from the cold ground. I found it quite impossible to sleep on my face. The lungs at these heights need free play. Another interesting effect of altitude was the discovery that I could sensibly warm myself, when a little chilled, by spells of rapid deep breathing. This happened a number of times through the night, and I am reasonably certain that the effect was real and not due to imagination.

I was up again at dawn, fumbling miserably with a dead fire. The day was crystal clear, bitter cold; the wind unabated. Match after match blew out, but when a tiny blaze did catch, it went! The boys never budged until the sun was up. I envied their metabolism and youthful relaxation. I ate the last of my bacon, another cup of wild rice, and, with plenty of strong tea, felt fresh and ready for what I knew would be a tough day. At seven forty-five I was off, one of the boys shooting my last ten feet of film as I groped over the rocks along the lakeshore. Through my glasses I had reconnoitered what appeared to be a practicable route up a grass gully for about 1500 feet of the northern wall of the gorge southwest of the lake.

The climb began brutally and the angle steadily increased until an occasional handpull was helpful. Frequent rests were in order. The views down, and out to the south and east, were magnificent. Mental pictures of scenes like this never fade.

Halfway up I heard a sudden rattle and clatter above me. A herd of eight bighorn sheep—ewes and a half-grown lamb—were scurrying across the cliff. I froze, looking at them through my glasses, and they stopped and peered down at me. All except the lamb. It seized the opportunity to nurse, but its mother kicked it aside impatiently. Convinced that I was harmless, they resumed their airy pilgrimage, drifting to the left toward savage precipices, and with such consummate grace, ease, and balance that I felt abashed at my own awkward, panting efforts. It was a wonderful sight and a rare one, I was told, to catch these remnants of the old West in their native haunts. How I deplored the squandering of my last ten feet of film!

The final pitches were steep and I needed every calk in my boots. One of the tricks of safe, efficient climbing is to plant down the whole foot, not merely the toe, a matter of full ankle-flexing, the secret of the remarkable climbing powers of the elephant. Flat-footed climbing is also far less tiring. But it was hard work, good technique or not, and I was thankful to sprawl at long last upon the broad back of the ridge at a height of about 12,500 feet.

Satisfaction, however, was short-lived in the southwest gale howling across the alpine savannas. I put on a spare hunting shirt and sweater under my field jacket and discarded my hat for a sleeping helmet. But, even so, that icy wind seemed to knife clear through me. At great heights wind is a fearful thing. It looked about a mile to the crest of the Divide where I could turn northward and put the wind at my back. The Bear Lake traverse southward along the Divide was an impossibility. Once or twice I wondered a little whether I had what it took to get to where I could head northward. It was really hard going for awhile.

I retain some impressions of the grandeur of the broad roof of the continent on that cloudless day. But they are sublimated in a vast drumming of wind and clutch of cold. In all directions visibility was limited only by the curve of the earth. I have never seen anything like it. Once I flushed a flock of ptarmigan, already speckled with winter plumage. The elk had left their high summer pastures, but records of their recent presence were abundant. Man was the only animal fool enough to roam these windlashed lonely barrens.

The timbered gulf of Milner Pass loomed sensibly nearer. I began to go downhill in earnest. The gale eased, then died away. The photons of brilliant alpine sunshine got in their beneficent work. I shed my arctic garb, munched a chocolate bar, and basked. Below through the spruce was the road to the madhouse we call civilization. Far behind and above stretched the desolate sunlit mountain wilderness.

It would be a long time, if ever, before I succumbed again to its "fever."

ANSWERS TO APPLE QUIZ

A. a—3; b—6; c—5; d—2; e—1; f—4;
B. g—11; h—12; i—7; j—8; k—9; l—10;
C. m—17; n—18; o—13; p—15; q—16;
r—14; D. s—23; t—22; u—24; v—21;
w—19; x—20.

THE READER'S MARKET

A place where members of the American Nature Association and readers of Nature Magazine may find many interesting offerings or may advertise themselves, at low cost, for things wanted; things they have for Sale, for Trade, for Sale or Trade. This is an excellent forum for acquiring or disposing of such items as binoculars, books, cameras and photographic equipment, magazines, sports and outdoor equipment, etc.

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1. *Transactions based on good faith:* Transactions are based on good faith and mutual satisfaction. Deliberate misrepresentation, disregard of usual business ethics or the attempt to circumvent these general requirements, when brought to our attention, will result in refusal of further advertising.

2. *All orders subject to these conditions:* We reserve the right to edit all copy to conform with our standards and to reject or discontinue any advertisement which we consider undesirable.

3. *Who may advertise:* This department is an open market trading post. Any individual or firm whose advertisement and methods of doing business meet our requirements may advertise their goods or services.

4. *Rates:* All classified advertisements must be accompanied by remittance. The rate is 15c per word including name and address—minimum charge $2.00. Cash with order.

5. *How to count numerals, etc.:* Groups of figures are counted as one word. Abbreviations consisting of initials or single characters likewise are counted as one word. Hyphenated words are counted as two words.

6. *"For Sale" ads must state prices:* A specific price must be stated on all FOR SALE ads —except that the phrase "write for catalog" may be used when listing real estate or merchandise in quantities.

7. *Conditions of trade or sale:* The condition of binoculars, cameras, instruments, other equipment useful to outdoor lovers, home-owners, etc., advertised for sale or trade must be specified as follows: PERFECT—meaning factory condition; EXCELLENT—meaning new condition, implying negligible amount of use; VERY GOOD—meaning practically new condition, implying little use, with no appreciable wear and only minor surface scratches or wear; GOOD—meaning moderate condition and with only moderate wear; FAIR—meaning no parts missing necessary to use, reasonable wear inside and out; POOR—meaning marred appearance or badly worn.

8. *Non-specific phrases barred:* Phrases such as "highest" or "top prices paid", as well as any other so-called "auction-type" phrases are not acceptable. The terms "fair price paid" or "state price wanted" may be used.

9. *Blind ads not acceptable:* Box number or blind ads will not be accepted. Give your complete name and address to insure prompt delivery of all mail or telegraph replies.

10. *Requesting privilege of examination:* Purchasers desirous of examining merchandise before acceptance should request shipment by express C. O. D. with examination privilege. This procedure permits the purchaser to inspect the merchandise in local express office and authorizes the express company to return unsatisfactory merchandise at shipper's expense.

11. The association will not accept for publication in NATURE MAGAZINE, advertisements of firearms, ammunition, or patent medicines.

12. *Responsibility for illegible copy:* Type or print advertisement plainly as we cannot be responsible for errors due to illegible writing.

13. *Closing date:* The closing date of all advertisements is the 20th of the second month preceding month of issue.

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JUNE AND JULY SKIES

(Continued from page 323)

and is in its best position for observation. The head outlined by four faint stars lies beneath the foot of Hercules, and the body coils in a long line of faint stars that can be traced from the head, first in a northerly and then in a westerly direction, passing between the bowls of the two Dippers. The star that marks the tip of the tail of Draco lies almost directly north of the Pointers of the Big Dipper, which, by the end of June, lies in the northwestern sky. Cassiopeia at this time lies below the pole and near the northeastern horizon. By the end of July the continuation of the branch of the Milky Way that adorns the winter sky may be traced high across the eastern summer evening sky from Cassiopeia to Scorpio. It is among the brilliant star-clouds of Sagittarius that the center of our galactic system lies, a distance of some sixty thousand light years from our own solar system.

On June 3 there will be a partial eclipse of the moon, the magnitude of which will be small. Only two hundredths of the moon's diameter will be covered by the shadow of the earth at time of greatest eclipse. This eclipse will not be visible in the western hemisphere, but may be seen generally in parts of Europe and Asia, and in Africa, Australia, and Antarctica, the Indian Ocean, and parts of the South Atlantic and Pacific Oceans.

During most of the month of June the planet Mercury will be well-placed for observation in the evening sky. It will be at greatest eastern elongation on June 17, and will then be a few degrees south of Castor and Pollux in Gemini. Its brightness will slightly exceed that of Pollux, which is a star of the first magnitude. It should not be difficult to locate this elusive planet at this time in the evening twilight. For the first three weeks in June it will be about 15 degrees above the western horizon at sunset. In July, however, Mercury will be for much of the time either poorly placed for observation or lost in the rays of the sun. It will be in inferior conjunction with the sun on July 14, when it will pass to the morning sky. By the end of July it will again be found a little to the south of Castor and Pollux but in the morning twilight.

Venus will remain in the morning sky throughout these two months, but is drawing in closer to the sun. By the end of July it will be close to the eastern horizon at sunrise. It is now receding from the earth and approaching superior conjunction with the sun. In the telescope it shows the same phase as the gibbous moon.

Mars will be in the morning sky during these two months, passing from Aries into and nearly through the constellation of Taurus before the end of July. Late in June it will be found a few degrees due south of the Pleiades. About the middle of July Mars will be a few degrees nearly due north of Aldebaran and similar to it in color and brightness. Early in June Mars rises about two hours before the sun, and by the end of July it will rise nearly four hours before the sun.

Jupiter will be found in the constellation of Libra throughout these two months. At sunset, early in June, it will be visible in the southeast and will be above the horizon most of the night. By the end of July Jupiter will be near the meridian at sunset, and will pass below the western horizon near midnight.

The three planets, Venus, Mars, and Jupiter, will all get so nearly in line with the moon at certain times during these two months that, as seen from some regions on the earth, they will be temporarily occulted or hidden behind the moon for short periods of time. At other places on the earth they will appear at these times to come close to the moon. On June 17, at some places between the 88th and 46th parallels of north latitude, Venus will appear to be occulted by the moon. In the United States this will appear only as a close approach of Venus to the moon. Mars will be seen occulted by the moon on June 16 in many places between the parallels of 3 North and 73 South latitude. Mars will again be seen occulted by the moon on July 15, at some places between the 23rd parallel of North latitude and the North Pole. Jupiter will be occulted on three occasions during this two-month period. On June 2 there will be occultations of Jupiter visible at some places between 34 North and 44 South latitudes. On June 29 there will also be occultations of this planet occurring at a number of places between the parallels of 50 North and 28 South latitudes. At about 4:09 P.M. on the afternoon of June 28, in Pacific Time, the reappearance of Jupiter from behind the moon will be observable at some places on the Pacific Coast. The disappearance of the planet behind the moon will have occurred there when the moon was below the horizon. A third occultation of Jupiter will be visible on July 26 at some places between 48 North and 30 South latitudes.

Considerable calculations are required to predict the time of occurrence of an occultation at any one place on the earth. Many occultations are predicted and observed, however, at a number of places, both in the northern and southern hemisphere, for the purpose of improving the tables from which the motion of the moon is predicted and finding the cause of irregularities in its motion in its orbit.

The planet Saturn will remain in the constellation of Cancer during these two months. It appears as a yellowish star of first magnitude. In June it is well over in the western sky at sunset, and before the end of July will be low in the west in the evening twilight, setting about an hour after the sun.

Summer will begin in the northern hemisphere, and winter in the southern hemisphere, on June 22 at 1:19 A.M., Eastern Standard Time, when the sun reaches its greatest distance north of the equator.

CAMERA TRAILS

(Continued from page 327)

Probably, in this column devoted to shore birds and their charms, we have not changed the opinion of a single woodland bird lover. But that is not what we set out to do. We like woodland birds, too, and we will write about them some day. But, since there is such a warm spot in our hearts for the tiny, graceful least terns—as well as for their larger shore brethren—and since we do look forward each spring to visiting their nesting places, we have devoted this section to them.

FILTER FACTS

And now for a short run-through of the commercial mail that has accumulated since we prepared the preceding "Camera Trails" section.

With summer coming and sunny, cloud-studded skies ahead, camera companies have bethought themselves of filters—aides in capturing those clouds and skies on film. Argus, Inc., reports a series of six filters now available—light yellow, dark yellow, green and red, plus two others for haze and for outdoor use with indoor-type color film. Two sizes of filters are offered, one 30mm in diameter and the other 41mm in diameter. They fit all lens mounts, ranging from 19mm to 41mm. Lens shades and adapter rings also are available for both sizes of filters.

For photographers not already familiar with the use of filters, and for others who might want to "brush up" on filter techniques, the makers of Omag filters offer a book said to "take all the mystery out of filters." This book, *How To Filter-Paint Your Pictures With Omag Filters*, may be obtained without charge by writing the Chess-United Company, Inc., 29th Street and Madison Avenue, New York City. Be sure to mention Nature's "Camera Trails."

A new addition to Eastman's handy family of Kodaguides is the one for flash photography. This *Flash Kodaguide* is intended primarily to aid amateur photographers in using a single synchronized flash lamp. With the great increase in the number of flash attachments on the market, we imagine many new flash users will welcome it. The Kodaguide is obtainable through all Kodak dealers—price twenty cents.

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Under the Microscope

By JULIAN D. CORRINGTON

STARCH GRAINS

By Helen M. Gilkey

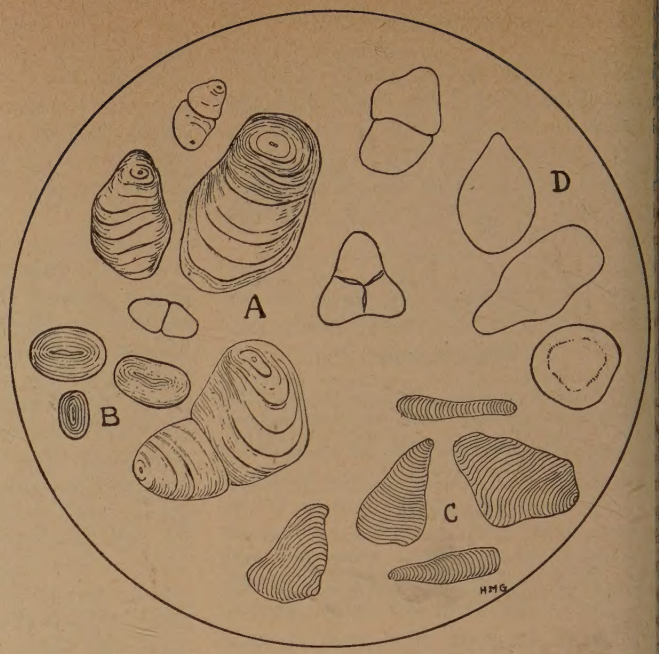
A RECENT bulletin by Dr. W. J. Robbins, director of the New York Botanical Garden, is entitled, "Sugar is the Foundation of All Life." That title implies the importance of starch, also, for this is the common storage form of sugar.

As a guide to the sources of starch grains, and in order to study them appreciatively, let us look for a moment at their origin and significance. As everyone knows, green plants are the source of all sustenance on the earth, because they manufacture the food that—directly or indirectly—supports all life. Out of the minute proportion of carbon dioxide that is found in the air, plus water normally taken from the soil, they carry on complicated processes of analysis and synthesis within their cells of protoplasm; and the finished product is sugar. Then, in most cases, the sugar is rapidly changed into the storable product, starch. During the day, while the busy little cell factories, in the presence of sunlight, are manufacturing sugar in enormous quantities, certain protoplasmic bodies within the cells are equally busy converting the sugar to starch and packing it away in the cells, in the form of grains, to make room for the constantly increasing supply.

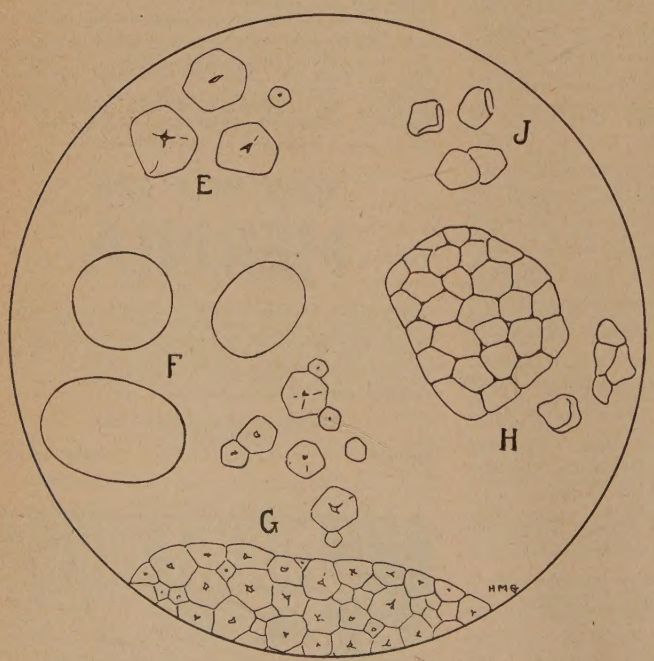
By the end of a normal sunny day, all available cells in the green parts of the plant—principally leaves and young stems—are stored to capacity with starch grains. At night when the tiny factories are stilled—since sunlight is necessary for their operation—these grains are again changed into sugar in order that they may be transported from cell to cell through the walls, eventually to reach permanent storage where, again transformed into starch, the food remains until needed.

In green plants of temperate regions, much more food is manufactured in summer than is utilized for growth during that period, and the surplus, except for a negligible amount needed for the reduced activities of winter, is hoarded until required for resumption of growth at the end of the resting season. That explains why many plants get off to such an early start with the first warm days of spring. Buds are bursting, shoots appearing, and even flowers opening, before the plant can possibly make new food in sufficient quantity for such activity. Starch, packed in storage cells in practically all parts of plants—bulbs, tubers, corms, roots, trunks—is changed to sugar and transported rapidly to buds and root tips where growth is humming. "The sap is rising." And with the first exposure of green parts to the sun, sugar again is being synthesized, and changed to starch to replace that which is utilized by growth.

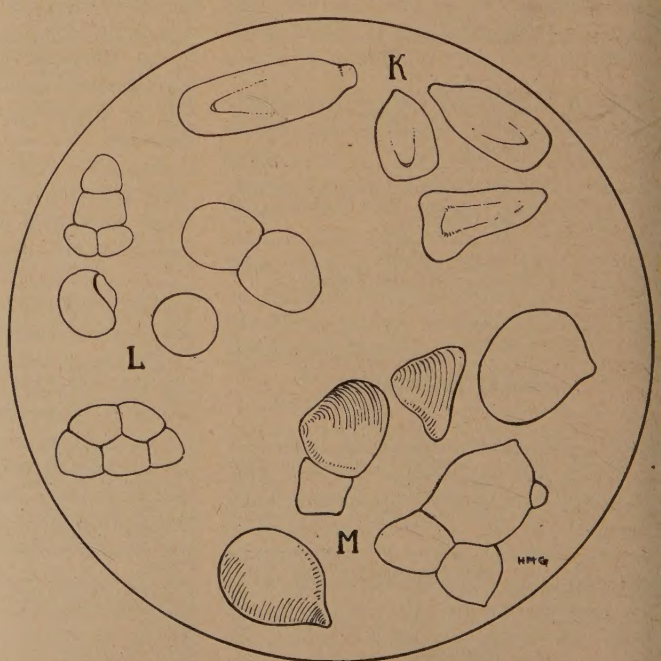
Although the food reserves of certain plants are found mainly in other forms such as oils, yet practically all green plants contain starch in some quantity at some time. Potatoes are full of it. So are grains of corn, wheat, oats, barley, rice, and buck-



Starch grains (A) potato, (B) bean, (C) banana, (D) Equisetum, all enlarged 30 diameters.



Starch grains from (E) corn, (F) wheat, (G) buckwheat, (H) oat, (J) nasturtium, all enlarged 660 diameters.



Starch grains from (K) iris, (L) English laurel, (M) ginger, all enlarged 500 diameters.

wheat. This fact is generally known. But not such common knowledge is the fact that starch is also found in pepper, cotton, palms, elms, and almost any other plant one can name.

It is interesting to know that starch grains differ with the species, each kind of plant having its distinctive type of grain. Some of these are not readily distinguished from each other, but in many cases the differences are so marked that an expert can identify numerous plants by their starch grains. The advantage of this may not immediately be obvious until one realizes that adulteration of plant products may thus be detected. Before the Pure Food and Drugs Act went into effect, adulteration of ordinary prepared foods and drugs was common. Powdered substances such as flour, baking-powder, spices, and cocoa, lent themselves admirably to this practice. A single sample of black pepper has been found to contain as many as thirty different adulterants such as cheap starches, ground nut shells, flaxseed meal, buckwheat hulls, and many other organic materials that the trained microscopist has learned to identify. Pepper, itself, contains a considerable quantity of starch, but its minute grains are in striking contrast to easily recognizable coarser starches that frequently, in earlier times, were mixed with it. Even today such practices are not unknown, and the maintenance of standardized products requires eternal vigilance.

Starches are among the easiest of all materials to examine under a microscope, for their preparation is simple. Slides and cover glasses should be thoroughly washed each time they are re-used, in order to prevent contamination by grains of other species. Sources, as we have seen, are underground storage organs of plants—tubers, etc.—together with tree stems in winter, green fruit, leaves in late afternoon of a bright sunny day, and most seeds. Other substances than starch are sometimes stored in plants. When in doubt, we apply a drop of dilute iodine, which promptly stains starch deep blue.

An interesting starch with which to begin this fascinating study is that of potato. You have noticed that the cut surface of a potato, if allowed to stand for a time, becomes filmed with a white powder. This powder consists of masses of partly dehydrated starch grains. In their normal state, the grains occur within the cell sap. Therefore, to prepare a slide, we simply place upon it a drop of water, cut the potato in two and, with a knife or scalpel, scrape the cut surface and deposit in the drop of water a little of the milky-looking fluid secured. When topped with a cover glass, the slide is ready for examination by low power. When we have located the grains, which may at first appear to us like queer air bubbles, we turn on the high power and carefully study their construction. Starch grains make especially favorable subjects for use with dark-field and also with polarized light.

Each grain is seen to consist of a series of layers (called *lamellae*) of varying thickness, excentrically arranged. The grain was built up layer by layer from the circular point (the *hilum*) of first deposit. The irregular lamination of simple grains strongly suggests the markings of an oyster shell. Sometimes two or three (rarely more) grains in close contact apparently complete their development together and form so-called "compound" grains. Generally each is complete in itself, but is fitted closely into the structure of the others. Occasionally, however, two grains are independent for a time, but adhere and continue as a single center about which common layers are added. Those appear to have two hila.

Somewhat similar to potato grains are those from green banana. Most green fruits contain starch, the ripening process consisting largely in the conversion of starch to sugar. In banana starch grains, as in potato, the lamellae are distinct, but here they are not excentric, the grains are much more variable in shape, and compound grains are few.

Occasionally among the winter stores of small burrowing rodents are found quantities of strange, dried, top-shaped objects that prove to be tuber-like storage organs of a species of horse-tail or scouring-rush (*Equisetum*). Examination of one of these structures shows it to be packed with large starch grains of varied and peculiar shape. They tend to break down rapidly in water, exhibiting clefts that elongate until the grain loses its identity. While starch is not soluble in cold water this breaking-down process occurs eventually in all grains mounted in water for study, and limits the time in which a given slide may be viewed. With ordinary magnification, the hilum and lamellae of this starch are obscure. *Equisetum* is not a flowering plant but is related to the ferns, which are spore-bearers. So we find that starch production is not confined to the "higher" plants.

Corn starch consists of somewhat angled simple grains, generally with a straight or branched cleft across the hilum. Wheat grains are larger than corn, and appear round or elliptic. The hilum is central but generally, like the lamellae, obscure. Rye and barley grains strongly resemble wheat, but barley grains average smaller and rye grains larger, with the lamellae distinct.

Buckwheat starch grains are minute and angled, with the hilum usually evident. Aggregates, representing often the entire content of a cell, are common; and this, too, is characteristic of oats and rice. In neither of the two latter, however, is the hilum conspicuous, and rice grains are generally more sharply angled.

The queer, wrinkled, three-lobed dry fruits of nasturtium yield small starch

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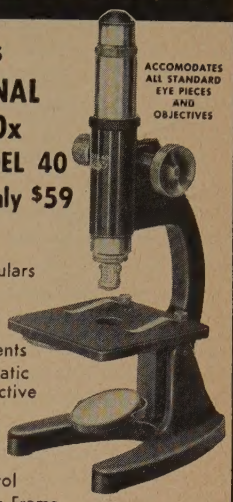

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grains somewhat resembling the three described above, but aggregates consist generally of only a few grains.

Powdered orris root of commerce is derived from the rootstock of Florentine iris, *Iris florentina,* and contains quantities of elongated starch grains with peculiar horseshoe-shaped fissures. Not having access to this species, and being curious to know how others of the genus compared, I made a slide from *Iris germanica.* The fissures are typical, though the shape of the grains is distinctive, somewhat suggestive of "the little brown jug."

Outside my window is a large shrub of English laurel, and from its year-old twigs I cut with a razor blade thin hand sections, which I macerated in a drop of water on the slide. Small simple and compound granules appeared, and with a drop of iodine I verified their identity as starch. They vary considerably in size, and are generally rounded on the free ends and flattened on the contiguous sides.

The beaked grains of ginger were found in scrapings from the rhizome in the form sold for pickling and preserving. Chinese, Japanese, and East Indian ginger, as known commercially, are generally distinguishable in crude form; and also to some extent in the starch grains. Powdered ginger often has been found adulterated with wheat middlings and flaxseed meal, both of which—by means of the microscope—can readily be identified.

These are a few interesting starches, but the limits of the study are inexhaustible. And as one becomes familiar with starch grains in powdered plant products, he finds associated with them other objects with which he will want to become acquainted—crystals of many forms, stone cells, spiral ducts, inulin. It is a hobby to avoid if one wishes a quiet easy ordered life with no digressions.

PRIZE CONTEST WINNER

The winner of the "write it yourself" contest, announced in the January issue, and whose excellent article on *Starch Grains* you have just read, is Dr. Helen M. Gilkey, Associate Professor of Botany and Curator of the Herbarium in the School of Science, Oregon State College, at Corvallis. A native of Montesano, Washington, Dr. Gilkey holds her B. S. and M. S. degrees from Oregon State College and her doctorate from the University of California. Her major work is with the flowering plants of North America, and her chief research interest is in the truffles or Tuberales, especially those of North America.

TEN YEARS UNDER THE MICROSCOPE

This lurid title cannot hope to compete in magnitude with *Twenty Thousand Leagues Under the Sea,* nor yet with *One Hundred Thousand Years in Sing Sing.* However, it will serve to recall to our older readers that this Department was inaugurated with the August, 1937, issue of NATURE MAGAZINE, so that the present installment completes ten years of writing about the microscope and the limitless worlds it makes accessible to the eyes of mankind.

In this period there have appeared 103 feature articles, including a pictorial history of the microscope in the rotogravure section. Of these, 22 have dealt with zoology, 14 with botany, 8 with general biology, 8 with parasitology, 10 with histology, 5 with embryology, 9 with industrial microscopy, 25 with some phase of microscopy proper, and 4 with scientific crime detection, this listing including a few subjects entered twice, under related headings.

Biographical articles and short features, aids to teachers and to advanced students, technique notes, an outline of the history of the microscope and of the development of ideas and of sciences made possible by this instrument, a beginner's primer surveying entomology, formulas, lists of books and supply houses, vocabularies, gadgets, microscope clubs, prize contests, puzzles, jokes, cartoons, poems, and other subjects have all found a place in this Department from time to time. Among the more useful items has been the Trade Notes section wherein catalogs of optical companies and supply houses have been distributed, prior to the war, keeping readers informed of the latest offerings. It is hoped that this service can soon be resumed as such literature again becomes available. Also included under this heading have been 331 book reviews, intended to apprise readers of the principal new works on microscopy and the sciences it serves.

Thirteen issues after the beginning, in October, 1938, the editor queried readers on the feasibility of organizing a national association of amateurs interested in microscopy, and the response was so encouraging that the following month saw the mailing of a questionnaire. The March, 1939, installment included announcement of the formal launching of the new group, christened the American Society of Amateur Microscopists, and two issues later appeared the first inclusion of A. S. A. M. news, a full page with its own heading. In succeeding months an insigne was adopted, officers were announced, the *Bulletin* began publication, and Chapters were formed. The Society, now eight years old, has survived the war period and should enjoy a long career as a useful organization aiding the interests of all who make the microscope their hobby or profession. The *Bulletin* attracts ever more scholarly articles, while retaining sufficient material of interest to the beginner. Latest development is the opening for use of the Simon Henry Gage Loan Collection of Microscope Slides, honoring the memory of the first President of the Society. From five to twenty-five slides at one time may be borrowed by any member, at very low rental costs, and are sent by mail for a period of three weeks.

In beginning the second decade, this Department looks forward to a continuance of service and information to readers. Newer subscribers are reminded that questions on any phase of this work will be answered by the Department Editor, Dr. Julian D. Corrington, 1306 Madrid St., Coral Gables 34, Fla.; likewise inquiries concerning the A. S. A. M. should be addressed to the Secretary, Herman W. Fowler, 2729 Connecticut Ave., Pittsburgh 16, Pa.

BIOLOGY

A. Franklin Shull's *Principles of Animal Biology,* written with the collaboration of LaRue and Ruthven, is now in its sixth edition. This is the original text championing the principles method, the taxonomic discussion of kinds of animals being relegated to a single chapter. In the revision, certain parts have been enlarged, others omitted or condensed, in order to avoid an increase in size. The emphasis is physiological, in keeping with modern trends, and a large number of small changes brings the material up to date; there is a striving for greater simplicity and clarity, with exactness of expression the keynote. Certain rearrangements and return of formerly deleted sections have been made at the suggestion of many of the teachers who use this book.

The new diagrammatic illustrations are excellent. It is to be regretted that the policy of substituting these for certain older cuts was not extended to cover the entire volume. Many of the illustrations retained are too small, poorly executed, or otherwise inadequate and decidedly antiquated in this day of pepping-up interest by means of so many new pictorial methods and devices. This conservative policy as to illustrations is not in keeping with the fine skill shown by the author in revising the text. Since 1920 this has been one of the finest works on the subject. Both kinds of zoology text have their uses, but the principles method, as exemplified by Shull, is far more interesting and instructive to the average student and general reader than a work involving a detailed survey of types. Pp. xi, 425; frontis., figs. 305. McGraw-Hill Book Co., Inc., 330 W. 42d St., New York 18, 1946. $4.00.